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BUREAU OF HYGIENE AND TROPICAL DISEASES

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MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

GALLO, G. & SAVINETTI, G. La malaria nel salernitano durante il periodo bellico e post-bellico. [**Malaria in the Province of Salerno during and after the War**] *Igiene e San. Pubblica.* Rome. 1954, Jan.–Feb., v. 10, Nos. 1/2, 51–113, 10 figs. [21 refs.] English summary.

This lengthy report opens with a description of the topography of the Province of Salerno, its population, climate and malaria history. Reference is made to the more important improvement schemes undertaken in the past.

From 1940 to 1946 there was a marked apparent increase in malaria incidence. The number of cases recorded in 1940 was 182, in 1946 2,059. The relatively few cases recorded in the early years of this 7-year period may be due to deficient notification consequent upon war disorganization. In 1947 systematic spraying with DDT was begun on a very large scale. In 1949 of the 36 indigenous cases recorded all but one were relapses. Not a single case was reported during any of the 4 succeeding years. In 1953, 2,121 blood preparations were examined: no malaria parasites were found. In the treated areas of the Province anophelism was almost non-existent, even a year after the last spraying operations. Rare residual anophelism was found in a few untreated places near protected zones from which anophelines may penetrate up to 3 km. into protected places. Such invading insects as have been caught and examined hitherto have been zoophile.

Norman White

DE MEIRA, M. T. V. Contribuição para o conhecimento sobre malária na Ilha de S. Vicente (Cabo Verde). (Relatório da Missão do Instituto de Medicina Tropical a Cabo Verde, em 1952–53.) [**Information concerning Malaria in the Isle of St. Vincent, Cape Verde Islands: Report of a Mission from the Institute of Tropical Medicine to the Cape Verde Islands in 1952–53**] *Anais Inst. Med. Trop.* Lisbon. 1954, June, v. 11, No. 2, 287–338, 11 text figs. (1 folding) & 32 figs. on 17 pls. (1 folding).

A mission from the Lisbon Institute of Tropical Medicine headed by the author of this report arrived in St. Vincent on the 24th November 1952. Its purpose was to obtain more exact information concerning malaria in the Cape Verde Islands, its importance, distribution, epidemiology, with special attention to its anopheline vectors, and to carry out or organize a campaign for the control or eradication of the disease.

A week before the arrival of the Mission St. Vincent experienced a phenomenal rainfall: 177·7 mm. fell in 5 days. The total rainfall of 1952 was 277·9 mm., all in the second half of the year, the wettest year since 1919. The result of this was the creation of extensive and innumerable breeding places for *Anopheles gambiae* in and around the city of Mindelo in which the vast majority of the population of St. Vincent are congregated. A very severe outbreak of malaria ensued and all the resources of the Mission were devoted to dealing with the emergency. Between December 1952 and July 1953 3,131 acute cases of malaria were studied, of which 2,193 were *P. vivax*, 885 *P. falciparum* and 53 mixed infections. No *P. malariae* infection was found. Most of the cases occurred during the first 3 months of the year, the maximum incidence in the third week of January, just 2 months after the phenomenal rainstorm. Approximately one-sixth of the population of the Island were infected.

The prevalence of *A. gambiae* in human habitations in the first 2 months of the years was extraordinarily large. It was the sole vector. *A. pretoriensis* in larval form was found in a few outlying parts of the Island: it played no part in the transmission of malaria.

A detailed account is given of the measures taken to combat the epidemic, DDT residual spraying, drug administration—paludrine [proguanil], aralen [chloroquine] and camoquin [amodiaquine] were used—and antilarval measures. *Norman White*

Chakrabarti, A. K. **Malaria Control—a Vital Element in a Mass Drive for Food Production. Part I.** *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1954, Sept., v. 2, No. 5, 170–76.

———. **Malaria Control—a Vital Element in a Mass Drive for Food Production. Part II.** *Ibid.* 1955, Jan., v. 3, No. 1, 24–8. [12 refs.]

The author reviews the history of the Himalayan foothill area known as the Terai, which has been long recognized as a great potential agricultural asset which could not be developed owing to the ill-health of the occupants and those who attempted to colonize it. After 1947 the Indian Government was faced with the dual problems of increasing food production and settling large numbers of people displaced in the process of partition. Pilot schemes were started in 4 areas in the districts of Naini Tal, Meerut and Almora and the present papers describe conditions in the first. The rainfall is heavy, humidity is high, the land is water-logged and intersected by great torrents carrying the rainfall from the hills, and malaria is hyperendemic. The vector was once thought to be *Anopheles minimus* but is now established as *A. fluviatilis* supplemented by *A. culicifacies*. There have been changes in *A. fluviatilis*, in which recent sporozoite rates have been lower than those previously recorded and which seems to be showing a greater anthropophilism. The reasons are not certainly known but may lie in the control programmes and a change in the prevalence of cattle. There have also been changes in parasite incidence, *Plasmodium falciparum* tending to predominate in place of *P. vivax*. *G. Macdonald*

Masseguin, A. & Palinacci, A. Présence de *Plasmodium ovale*, Stephens 1922, en Haute-Volta (Afrique Occidentale Française). [**Presence of *Plasmodium ovale*, Stephens 1922, in Upper Volta (French West Africa)**] *Bull. Soc. Path. Exot.* 1955, v. 48, No. 2, 170–74, 3 figs. on 2 pls. [20 refs.]

The authors discovered 8 cases of *Plasmodium ovale* in the Upper Volta region (French West Africa), in 69,307 blood examinations, of which 93·5 per cent. were positive for malaria. This malaria was in 85 per cent. of cases due to *P. falciparum*, the rest to *P. malariae* and a single infection of *P. vivax*. The *P. ovale* infections were all in children or adolescents and were found in Po, Tougan-Nouna, and Bobo-Dioulasso. The parasite showed the following features: prominent Schüffner's dots, an enlargement of the erythrocyte even greater than that caused by *P. vivax*, the usual oval shape and characteristic distortions of the red cell, and in two cases a great density of infection. *P. C. C. Garnham*

Voukassovitch, P. & Gladilin, N. [Contribution à l'étude des variétés d'*Anopheles maculipennis* Meig.] [**Studies of the Varieties of *Anopheles maculipennis***] *Bull. Inst. Hyg.* Belgrade. 1955, v. 4, Nos. 1/2, 41–50. [14 refs.] [In Serbian.] French summary.

In July–August 1954, *A. maculipennis maculipennis* and *A. m. messeae* were found in various areas of the Istok and Petch districts in Yugoslavia. *A. m. maculipennis* predominated, amounting to 88·7 and 86·6 per cent. of captures in the respective areas. No other varieties were found. Later in the year, another series of captures was made in Petch and Prizren. In the laboratory, an average of 37·4 per cent. of females of this species oviposited. The greatest amount of oviposition in the laboratory, at 21°–22° C., took place on the second day. Again the same two varieties only were found: the females of *A. m. messeae* were lighter in colour, smaller and slighter than those found in the Belgrade region.

Owing to variation in the coloration of the eggs and in order to attempt a more realistic classification, the authors classified each batch of eggs as "typical" or "non-typical" of the varieties in which they were placed, though there were admittedly difficulties owing to anomalies within a particular batch or batches.

Among 158 batches of eggs thus classified 41·1 per cent. were attributed to *A. m. maculipennis* and 28·5 per cent. were typical: 58·9 per cent. belonged to *A. m. messeae* and 38 per cent. were typical.

It is noted that the predominance of *A. m. maculipennis* in the first series of studies was reversed: this is attributed to a high incidence of *A. m. messeae* in a single locality, namely Cerovik. This area also was the only locality in which any other anopheline was found: here *A. superpictus* accounted for 27 per cent. of 128 females caught.

The fact that so many of the batches of eggs of both varieties of *maculipennis* were grouped as "non-typical" is tentatively attributed to cross-relationship between them. *H. J. O'D. Burke-Gaffney*

Vinogradskaya, O. N. [**The Participation of the Tracheal System in the Evaporation of Water in *Anopheles maculipennis messeae* Fall. and the Seasonal Variation in the Spiracle Index in Species of the Subfamily Culicinae (Diptera, Culicidae)**] *Ent. Obozr.* Moscow. 1953, v. 33,

157–60, 2 graphs. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1955, July, v. 43, Pt. 7, 106.]

Insects lose water by evaporation through the cuticle covering the body or through the surfaces of the tracheae, and an account is given of tests to discover which of the two ways is the more important in *Anopheles maculipennis messeae* Flni. Since a content of 1 per cent. carbon dioxide in the air causes this mosquito to keep its thoracic spiracles almost constantly open, males and females were exposed for 30 minutes at temperatures of 22–26°C. [71·6–78·8°F.] to dry air containing 2–3 per cent. carbon dioxide or virtually none. Their loss of water was estimated from their weights before and after exposure. The percentages of weight lost by the mosquitos exposed to carbon dioxide and (in brackets) the others were 12·33 (3·21) for females in different stages of blood digestion taken from day-time shelters, 23·6 for newly emerged females, and 23·1 (1·9) for newly emerged males. Since the water loss was so much greater for the mosquitos induced to keep their spiracles open, it is concluded that evaporation proceeds mainly through the surfaces of the tracheal system, and this is in agreement with earlier findings as to the differences in size of the spiracular openings in different species of *Anopheles*. Differences in the thoracic spiracle index were likewise found to exist in other mosquitos (*Aëdes* spp., *Culex pipiens* L. and *Culiseta* (*Theobaldia*) *silvestris* Shingarev). The variations in the indices in these mosquitos are shown on graphs. The indices were larger in *Culex* and *Culiseta*, the hygrophilous *A. cinereus* Mg. and *A. excrucians* (Wlk.), and *A. cataphylla* Dyar and *A. dorsalis* (Mg.), which occur in spring, than in *A. caspius* (Pall.) and *A. vexans* (Mg.), which are summer species and comparatively resistant to dryness. It was also found that within the same species (*A. caspius* and *A. vexans*) the indices were larger in adults that emerged in spring than in those that did so in summer, which is probably an adaptation to seasonal conditions. In females of *Anopheles m. messeae* taken near Moscow, the indices were larger at the beginning and end of the summer than at mid-summer.

Ariaratnam, V. **A Note on the Daytime Resting Habits of *A. culicifacies* in Ceylon.** *Indian J. Malariology.* 1955, Mar., v. 9, No. 1, 17–26, 2 maps. [13 refs.]

Observations on the type of resting places of *Anopheles culicifacies* adults have been rather contradictory [*J. Malaria Inst. of India*, 1940, v. 3, 12. See this *Bulletin*, 1941, v. 38, 105]. In some parts of India they have been known to show a decided preference to rest in cattle sheds [this *Bulletin*, 1937, v. 34, 627], whereas in Ceylon the species rests inside dwelling houses after a blood meal [*ibid.*, 1952, v. 49, 667]. This, as the author of the present paper suggests, may be due to the fact that cattle are usually tethered in the open; when they were tethered near houses, the catch from the houses was higher.

Collections were made from 28 houses in 2 unsprayed villages. Half the number of houses had mud walls, 10 had mud walls with the surfaces lime-washed, and 4 had walls of *cadjan* (*cadjan* is made from dry coconut leaves). Most of the houses consisted of only 2 rooms, one of which was used as the living room and dormitory and the other as a kitchen.

The mosquitoes were most prevalent in houses with *cadjan* walls, probably because *cadjan* provides more secure and unexposed recesses to hide in. Next in order came the houses with mud walls and lastly houses with lime-washed walls. The mosquitoes seemed to prefer the living room to the

kitchen. The majority were found resting on the inner walls, comparatively few being found on furniture and hangings. This is contrary to the observations of Muirhead-Thomson [*ibid.*, 1952, v. 49, 336] and Pal and Sharma (*Indian J. Malariology*, 1952, v. 6, 281) who found the mosquitoes relatively more frequently on clothes, umbrellas, furniture, firewood, etc. The present investigations revealed that windows and doors harboured considerable numbers of adults. Most of the mosquitoes were found at heights below 2 ft. and a few at heights above 6 ft. *M. G. R. Varma*

Ansari, M. A. R. & Nasir, A. S. **A Preliminary Note on Anophelism of Lahore Suburbs.** *Pakistan J. of Health.* 1955, Jan., v. 4, No. 4, 212–23, 4 graphs. [12 refs.]

Catches of adult anophelines from human dwellings and cattle sheds in 6 villages on the outskirts of Lahore (Pakistan), revealed the existence of 2 peaks of anopheline density, one in spring (March and April) and the other in October or mid-November. Correspondingly, there were two depressions, one during the hot dry months of May, June and part of July and the second in winter (December, January and February). The authors suggest that this may probably represent periods of aestivation and over-wintering, although a true instance of hibernation of the adults was not observed. The smaller number of mosquitoes caught during winter was probably due to the large number of deaths produced by a low temperature.

Anopheles subpictus was most prevalent, followed in descending order by *A. annularis*, *A. stephensi*, *A. pulcherrimus*, *A. culicifacies*, *A. hyrcanus*, *A. splendidus* and *A. fluviatilis*. A tabulated summary gives the periods of maximum and minimum densities of these species, and also the probable causes for the seasonal fluctuations in numbers.

A. subpictus was most prevalent during the rainy season (July, August and September), the numbers falling off in winter and early spring. The pattern of density was the exact reverse in the case of *A. annularis*, this species being most prevalent in winter and early spring when there is always a general diminution of anopheline population. This may be due to the fact that this species is able to endure better low temperatures and unfavourable weather. Density of the adults thus depends on climatic and possibly microclimatic factors and ability of the different species to endure unfavourable conditions. Delayed and excessive rains checked the incidence of the mosquitoes and of malaria.

Although Covell [this *Bulletin*, 1927, v. 24, 881] and Puri [*ibid.*, 1937, v. 34 (164)] have recorded *A. barbirostris*, *A. maculatus* and *A. theobaldi* from Lahore, the authors did not collect any of these species. *A. splendidus*, on the other hand, has been recorded for the first time.

Dissection of *A. stephensi* and *A. culicifacies* gave negative results. But the authors are of opinion that *A. stephensi* may be the vector in the area investigated. *M. G. R. Varma*

Young, M. D., Eyles, D. E., Burgess, R. W. & Jeffery, G. M. **Experimental Testing of the Immunity of Negroes to** *Plasmodium vivax*. *J. Parasitology.* 1955, June, v. 41, No. 3, 315–18.

This paper gives some new observations and summarizes past work on the relative insusceptibility of American negroes to *Plasmodium vivax*. The patients were suffering from general paralysis—Negroes and whites were used as controls. They were infected with the following strains: — St. Elizabeth,

Chesson (and other Pacific strains), Korean and Mediterranean. Neither the strain, nor the mode of infection (blood or mosquito) produced any difference in the results; the Negroes were throughout more refractory than the whites to *P. vivax*, 23 per cent. of the former and 96 per cent. of the latter developing infections. Massive inoculations did not succeed in infecting more Negroes, and once again it was shown that infectivity does not depend upon the amount of the inoculum. In one experiment, a successful infection in a Negro was transferred to another Negro to see if the parasite was becoming adapted—but the subinoculation failed.

It seems, therefore, that the Negro has a natural resistance to all strains of *P. vivax*. [It would have been interesting to have tested an East African strain of the parasite, because in that part of the world there are foyers where the parasite is quite common among the Negro inhabitants.]

P. C. C. Garnham

Hentsch, H. F. G. Beobachtungen über die Häufigkeit kongenitaler Malaria auf Djawa-Timur (East-Java). [**Observations on the Incidence of Congenital Malaria in Djawa-Timur (East-Java)**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1955, June, v. 6, No. 2, 184–7.

From 1st March 1953 to 30th August 1954, 1,019 mothers who had borne living children in Djawa-Timur (East-Java) were examined for malaria by thin and thick drop methods. Of these 91·85 per cent. harboured malaria parasites of two species; 40 per cent. had *P. vivax*, 45 per cent. had *P. falciparum* and 15 per cent. had a double infection. Only 15 (1·5 per cent.) had no palpable splenic enlargement. On the whole a high percentage of the population were also infected with hookworm and amoebae.

Malaria rigors were frequently encountered during labour and the puerperium. In 3 instances rupture of the spleen occurred. Blood preparations were examined from the umbilical cord, as well as from the maternal placenta, by a similar technique. In 665 cases out of 1,023 black pigmentation of the placenta was observed and in 18 new-born infants splenic enlargements of 3 finger-breadths were palpable.

In 1,023 cases, blood from the big toe of the new-born child contained malaria parasites in 9·97 per cent., blood from the umbilical vein in 9·68 per cent., blood from the placenta in 91·58 per cent. In these investigations thick-drop preparations yielded a slightly higher percentage of positives. All new-born infants, whether their mothers were infected or not, were nursed in mosquito-proof wards; 103 were malaria-free at birth and were found to remain so for 7 days; 12, the mothers of whom were infected during parturition, were subjected to sternal puncture 7 days after birth, but neither pigment nor parasites could be demonstrated.

The earliest case of malaria in a child free from parasites at birth was in a child of 29 days who developed the infection 16 days after discharge from the mosquito-proof ward.

Philip Manson-Bahr

Chaudhuri, R. N. & Dutta, B. N. **Milk Diet in Human Malaria.** *Indian J. Med. Sci.* 1955, June, v. 9, No. 6, 297–9. [12 refs.]

The authors administered 3 pints of milk and 2 ounces of sugar daily to 10 patients suffering from malaria (8 *P. vivax*, 1 *P. falciparum* and 1 *P. malariae*) for periods varying from 3 to 11 days, withholding other food or treatment. Parasitaemia continued in the cases of *P. falciparum* and *P. malariae* malaria and in 3 of the cases of *P. vivax* malaria. It is considered

that the improvement in the other *P. vivax* infections may have been due to spontaneous remissions occurring in semi-immunes.

Frederick J. Wright

Mohr, W. Die Therapie der verschiedenen Malariaformen mit Resochin. [**Treatment of Various Forms of Malaria with Resochin**] Reprinted from *Therapiewoche*. Karlsruhe. 1954, Oct., v. 5, Nos. 1/2, 29–33.

Oral resochin [chloroquine] was successful in controlling blood-transmitted and natural infections of *P. vivax* and *P. malariae*. *P. falciparum* infections and severe *P. vivax* and *P. malariae* infections responded to intravenous or intramuscular administration.

In blood transmitted *P. vivax* malaria oral dosage ranged from 10 tablets (each containing 250 mgm. salt = 150 mgm. base) in 24 hours—3 tablets immediately, 3 after 6 hours, 2 after a further 6 hours, and 2 after a further 12 hours—to 6, 5 or 4 tablets given once. Fever subsided inside 24 hours. Parasites disappeared from the blood in 36 to 46 hours.

In 30 natural infections (all *P. vivax*) oral dosage was 10 tablets in 24 hours. Fever subsided in 24–26 hours and parasites disappeared in 36–48 hours.

Intravenous therapy was given in a series of severe *P. vivax* (5 cases), *P. malariae* (3 artificial infections) and *P. falciparum* (8 infections). The total dosage ranged from 0·5 gm. to 1·5 gm. Doses were given in the form of injections of 10 cc. of a 5 per cent. solution at intervals of 8 hours. Oral administration succeeded or accompanied parenteral injection in some cases. Fever subsided in about 26 hours and parasites disappeared in 46.

Intramuscular administration of similar doses was carried out in both therapeutic and naturally acquired infections with *P. vivax* and *P. malariae* and in natural *P. falciparum* infections. Patients were free from fever in about 26 hours.

The author concludes that resochin is the safest and most reliable therapy for malaria. It is faster in action than proguanil and pyrimethamine. Unfortunately the exo-erythrocytic forms are not affected. Combined treatment with Plasmochin (pamaquin) or primaquine is necessary to prevent relapses of *P. vivax* malaria.

B. G. Maegraith

Kennedy, A. F. **Absolute Neutrophil Leucopenia after Uncontrolled Use of Amodiaquine.** [Memoranda.] *Brit. Med. J.* 1955, Aug. 20, 475–6.

A female European child aged 2 years was examined after having received 100 mgm. amodiaquine twice daily for 5 days, 100 mgm. on the sixth day and 200 mgm. on the seventh. The child had been ill for two weeks with vague malaise and " fever ", which the parents had interpreted as malaria. The white cell count was 6,400 cells per cmm. (polymorphs 4 per cent., lymphocytes 75 per cent.). A similar picture was recorded 2 days later on admission to hospital, where the child received a course of 300,000 units of benethamine penicillin every other day. A month after the child was first seen, tibial marrow showed normal numbers of cells, but with lymphocytosis and marked granulocytopenia. Penicillin was continued and pentose nucleotide added. Some days later procaine penicillin was given for follicular tonsillitis and the dosage of nucleotide was increased. Neutrophil numbers in the peripheral blood increased and a fortnight later the leucocyte count was 16,500 cells per cmm., with polymorphs 67 per cent.

The author suggests that the neutropenia was " in all probability due to the uncontrolled administration of amodiaquine ". A complicating factor in

accepting this view is that the child was seen 3 months earlier for pyuria and was given a fortnight's course (dosage not recorded) of sulphadimidine. The leucocyte count " at the time " was 6,900 cells per cmm. with a normal differential distribution.

[There are some mistakes in the dates recorded in the paper. It would be interesting to know whether the leucocyte count recorded during the episode of pyuria was made before or after treatment. In the light of the uncertainty about sulphonamide therapy the case, as seen by the reviewer, must remain " unproven ".] *B. G. Maegraith*

COLBOURNE, M. J. **The Effect of Malaria Suppression in a Group of Accra School Children.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1955, July, v. 49, No. 4, 356–69, 3 figs. [15 refs.]

The author gives a detailed account of a careful study of 176 school-children, aged approximately 7 years, divided into two comparable groups, one of which was used as a control. Observations were extended over 1 year and all but 23 children finished the course. Each child in the treated group received amodiaquine (200 mgm. base) and pyrimethamine (25 mgm.) on the first day of each of the three school terms, followed by pyrimethamine (25 mgm.) weekly in term time. The children in the control group received dummy tablets. Blood films and spleen examinations were carried out at monthly intervals. The body weights were recorded at the beginning and end of the investigation and the size of the liver at the end of the investigation. Records of attendances at school and probable causes of absenteeism were made and an assessment by the teachers of the mental abilities before and after the experiment.

The results are illuminating. It was clearly shown that in Accra:— (i) the drugs given controlled malaria; (ii) untreated children lose 5–6 days schooling per year from malaria; (iii) school absenteeism in treated children was reduced by 50 per cent.; (iv) no other definable benefit from treatment could be demonstrated.

It is concluded that until it can be confirmed that a year's freedom from parasitaemia does not result in increased malaria in subsequent years, a large-scale scheme of chemotherapeutic malaria suppression in schools under the prevailing conditions cannot be justified.

No evidence of drug resistance was found. The average orally recorded body temperatures were found to be 99·3°–99·4°F. and this elevation was no indication of malaria or ill-health. There was some evidence that high atmospheric temperatures may affect the normal level.

Frederick J. Wright

WALKER, A. J. **Potentialities of Monthly Doses of Camoquin and a Gametocidal Drug in Malaria Control.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1955, July, v. 49, No. 4, 351–5. [15 refs.]

The author investigated the effect of administering monthly doses of amodiaquine and primaquine to schoolchildren and infants and children of pre-school age in Malaya. Untreated children were considered to serve adequately as a control group. Below 6 years of age 100–200 mgm. amodiaquine and 15–30 mgm. of primaquine were given monthly to 114 children, a lottery stimulating the cooperation of the mothers. The observations showed that in the treated children *P. falciparum* malaria was eliminated and *P. vivax* malaria greatly reduced. The author recommends an extension of the experiment and also considers that for adults 450 mgm. of

amodiaquine and 60 mgm. primaquine monthly for 3 months would provide considerable protection in epidemics following the cessation of any long term insecticidal programme.

[The author does not state what proportion of the public were treated. Gametocyte control would only be of appreciable value if a high proportion were treated.] *Frederick J. Wright*

Morin, H. G. S. Sur une campagne antipalustre au Cameroun (1953–1954). Premiers résultats de l'enquête épidémiologique. [**Antimalaria Campaign in the Cameroons, 1953–1954. Preliminary Results of the Epidemiological Investigation**] *Riv. di Malariologia.* 1955, June, v. 34, Nos. 1/3, 37–47.

Yaoundé, the capital of the French Cameroons, had for long years an unenviable reputation for malaria; pernicious malaria and blackwater fever were both very prevalent. In April 1942 the sporozoite index of *A. gambiae* in 6 suburbs of the town varied between 9 and 33 per cent. and the gametocyte index of the populations of the same suburbs varied between 11 and 30 per cent. During the 8 following years Yaoundé developed into a very large commercial centre for forestry and agricultural products. Much building was done and roads replaced tracks. A very large number of Africans attracted by the labour opportunities offered crowded into villages in the urban and suburban areas. The distribution of prophylactic quinine, drainage work and anti-larval measures over and above continued urbanization work improved the malaria situation which nevertheless remained serious. New synthetic remedies effected a considerable reduction in malaria mortality in hospital establishments. Between 1944 and 1949, 14 per cent. of 2,382 Europeans admitted to hospital were suffering from malaria, confirmed microscopically, as were 4·87 per cent. of Africans admitted to hospital during the same period.

In 1949 insecticidal spraying of houses was begun. By the end of 1950 the urban centre of the town had been completely treated. Less than 5 per cent. of the 3,415 Europeans admitted to hospital during the years 1950–53 were suffering from malaria as compared with 4·5 per cent. of 25,998 African patients admitted during the same period. Most of the Africans live in areas surrounding the town and so were not directly benefited by spraying operations.

In 1953 the World Health Organization embarked on a malaria control scheme in a "pilot" area around Yaoundé. If successful the French Government has undertaken to extend the measures, with its own personnel, to other such areas capable of benefiting therefrom. A preliminary survey was begun in July 1953. In villages in the equatorial forest round Yaoundé remarkably few anophelines were found in African dwellings; search was made for outdoor resting places without success. The spleen indices found in villages in the pilot area were very variable. Indices above 40 per cent. were only found in small isolated groups. In some of these *A. nili* and *A. moucheti* were captured. Neither of these plays any important part in malaria transmission.

In April and May 1953 breeding places of *A. gambiae* were readily found along most of the roads in the area. In 1954 the rainfall was abnormally heavy and conditions were very unfavourable for *A. gambiae*: consequently there was very little malaria transmission that year. Conditions in this respect were almost as favourable in the pilot zone as they were in the sprayed centre of Yaoundé.

P. falciparum is responsible for all the malaria in this area: no other species was ever found. *Norman White*

Indian J. Malariology. 1954, Dec., v. 8, No. 4, 237–394, numerous illustrations. [Numerous refs.] **Symposium on** *Plasmodium berghei.*

Jaswant Singh in the introduction to this valuable symposium states that nearly 1,000 papers have been written about *Plasmodium berghei*, a malaria parasite of rodents which was discovered only 7 years ago, and which has proved of immense value in malaria research. His own introduction provides a useful abstract of the contents of the symposium; most of the contributors provide summaries of certain aspects of the subject, but others present the result of new or hitherto unpublished research.

L. van den Bergh's paper is valuable because not only does it give in a few words the story of the discovery of the parasite and its insect vector but it is accompanied by a reproduction of the original coloured illustrations of *P. berghei* and a photograph of one of its common hosts (*Thamnomys surdaster*).

I. H. Vincke in two papers gives useful information about (1) natural transmission and (2) laboratory transmission of the parasite, including details of its life cycle, and that of its mosquito host. Vincke now seems to doubt if true tissue stages of *P. berghei* have been found, and thinks that the parasites found in the organs after blood inoculation are probably not of tissue origin; his own work, however, shows that a pre-erythrocytic phase must exist. *Anopheles dureni* is a common mosquito in a few regions—in 2 years, over 10,000 specimens were collected on the same number of trees; a trained collector can easily find 200 in a single morning. This species is accompanied by *Anopheles concolor*, *A. berghei* and *A. implexus*, and may itself be a mixture of 2 or more closely related species. Since its discovery *P. berghei* has been isolated from 12 rodents, and from 367 mosquitoes (at least 297 individual cases). The strains are often named after the African sanitary assistants.

R. S. Bray gives an account of transmission work carried out at the London School of Hygiene and Tropical Medicine, a record which began with the successful experiments of Yoeli and Wall [this *Bulletin*, 1952, v. 49, 372 and 932] but continued with 2½ years' failure, although 200 animals and 5,000 mosquitoes (*Anopheles maculipennis*, *A. quadrimaculatus*, *A. stephensi*, *A. gambiae* and *Aëdes acgypti*) were used. Mature oöcysts were often found, but only once was a heavy infection of the salivary glands produced, but neither in this instance nor in others where the sporozoite infection was lighter was successful transmission to animals effected. The best results were obtained by feeding *A. stephensi* or *A. quadrimaculatus* on hamsters 5 or 6 days after infection. Bray thinks that *P. berghei* has the characters of a " rare species ", living in a closed vector-host system, in which it will probably be very difficult to substitute different organisms.

Probably the main contribution of *P. berghei* to malariology has been in the realm of chemotherapy, and J. Schneider gives a useful summary of this aspect of the subject, pointing out, however, its limitations. This species is susceptible to chloroquine, mepacrine and pyrimethamine, but only slightly so to the 8-aminoquinolines and the biguanides, thus differing from other " test " species like *P. relictum* and *P. gallinaceum*.

The physiology of malaria parasites both as regards themselves and their effect on the host has received considerable attention. B. G. Maegraith deals particularly with the latter aspect: this parasite lives essentially in

the reticulocyte where its metabolic requirements are similar to those of other species. The author discusses also the loss of iron caused by the multiplication of the parasite, shows that the iron in the form of haemozoin is taken up by the reticulo-endothelial system, but that possibly it never becomes available again for the construction of haemoglobin. This work is still in progress.

In an interesting paper by Jaswant Singh, S. P. Ramakrishnan, Satya Prakash and V. N. Bhatnagar, at the Malaria Institute of India, the alteration in the metabolism of sulphadiazine-resistant parasites is discussed. The effect is studied in mice on a milk diet, and on a balanced diet, and is contrasted with that found in non-resistant strains of the parasite. The resistant strain appears to have become able to do without para-aminobenzoic acid [PAB], and therefore the infections it causes are unaffected by the nature of the diet. An unexpected finding was that when small doses of sulphadiazine were given to animals infected with the resistant strain, and on a milk diet, the animals showed a mild parasitaemia for about a fortnight, possibly because the drug neutralizes some substance (other than PAB) which is essential for the nutrition of the parasite.

S. P. Ramakrishnan discusses the wider issues of nutrition and malaria, and shows that although lack of certain metabolites first has a detrimental effect on the parasite (and thus on the severity of the disease), later the host suffers from a higher mortality. The best balance seems to be achieved if the host is fed on a mixed diet with a low proportion of meat, a lacto-vegetarian diet would be the next best, the worst a mixed diet containing much meat.

A short paper by N. K. Ray and A. N. Bose is based on the probably erroneous idea that the reticulo-endothelial system is the "normal abode of malarial parasites during the pre- and exo-erythrocytic stages"; and on this assumption they tried the effect of oestrogen on *P. berghei* in mice and rats; oestrogen is said to stimulate this system. There was no change in the course of infections, though ovariectomy reduced the parasitaemia.

The remaining papers in the Symposium deal chiefly with immunity, which A Corradetti, F. Verolini and G. Toschi show is a true immunity, persisting long after parasites have disappeared. This is in regard to rats; R. M. de Smet and G. Frankie show that the same is true in respect of the wild rodent, *Cricetomys ansorgei*, even after sporozoite infection (incidentally this is the only example—apart from Vincke's work—of natural as opposed to blood infection, reported in the Symposium). But H. Galliard and J. Lapierre point out that the effect of age must be considered carefully in this connexion, because with advancing age—a necessary accompaniment of these immunity experiments—the rat's susceptibility to the infection decreases in any case. For this reason, they recommend that mice, in which this factor does not obtain, should be used in immunity experiments. They show that in mice, some plasmodicidal drugs are capable of inducing a sterilizing immunity which is completely and permanently effective.

G. Fabiani has studied the immunity problem in *P. berghei* for many years and gives his main conclusions in his paper as follows:—

(1) In susceptible animals inoculated: a lowering of the natural resistance (increase of reticulocytes).

(2) In susceptible animals inoculated after splenectomy: severe progress of infection (absence of acquired immunity).

(3) In animals which recover spontaneously from the primary infection: absence of relapse in spite of a latent infection; resistance to re-inoculation; relapses can be induced by certain procedures; disappearance of latent infections.

(4) In immune animals submitted to re-inoculations: reinforcement of immunity.

(5) In immune animals splenectomized: relapse or a chronic infection or a re-appearance of an immunity.

(6) In mice: possibility of appearance of immunity under the influence of milk diet or sulphonamide therapy.

The editor in his introduction expresses his gratitude to E. Sergent—a doyen of malariology—for his contribution: a study on the immunology of malaria by its greatest living exponent. Sergent describes the striking dissimilarity of reaction of different animals to the infection—the guineapig shows a complete sterilizing resistance, the white mouse a complete susceptibility; the response in the white rat varies according to the route of inoculation, but a latent stage of some duration usually follows the acute attack, and Sergent thinks this is no true sterilizing immunity but premunition.

G. Raffaele has made a wide study of the problem and here gives his main conclusions, pointing out the effect of age and the effect of splenectomy which brings older rats again into the susceptible class. This age effect is peculiar to *P. berghei* and is not seen in other types of malaria infections. The author agrees with most workers that a complete immunity can occur in rats. A milk diet will help this to occur also in mice and is particularly effective when begun the fortnight before inoculation.

J. Rodhain shows quite clearly that *P. berghei* and *P. vinckei* (a second and rare parasite of rodents in the Congo) are immunologically distinct: mice which survived *P. vinckei* malaria died from *P. berghei*, and young rats which survived *P. berghei* remained susceptible to *P. vinckei*. He notes that since the inoculations of *P. vinckei*, the strain has become progressively more pathogenic for mice and young rats, with no morphological change.

J. Greenberg and G. R. Coatney indicate how valuable it is to use highly inbred strains of mice in work with *P. berghei*, particularly for the study of heritable factors. They summarize their data from past work [see this *Bulletin*, 1954, v. 51, 350]. They present finally an interesting theory to explain the response to the infection of different animals: there are two mechanisms of control, (1) for the removal of infected mature cells and (2) for the removal of infected immature cells. The mouse develops only the former, and strains of mice differ in their ability; the young rat behaves similarly, as do many other rodents when splenectomized. But other rodents with intact spleens possess or acquire both means of defence.

P. C. C. Garnham

Huff, C. G. & Marchbank, Dorothy F. **Changes in Infectiousness of Malarial Gametocytes. I. Patterns of Oocyst Production in Seven Host-Parasite Combinations.** *Exper. Parasit.* New York. 1955, May, v. 4, No. 3, 256–70, 7 figs. [14 refs.]

The unpredictable results of feeding mosquitoes on malaria carriers have long been recognized, and this paper—which is the first of a series—attempts to analyse the factors concerned in the production of oöcysts. Seven combinations of vertebrate and invertebrate hosts and parasite were employed as follows:— *Plasmodium gallinaceum* in chicks infecting *Aëdes aegypti*, *P. fallax* in pigeons, chicks, guinea-fowl and turkeys infecting *Aëdes albopictus*, and *P. cathemerium* in canaries infecting *Culex pipiens* and *C. tarsalis*. The mosquitoes were allowed to feed daily on the infected birds from the beginning of parasitaemia, they were kept at 24–26°C and the mid-guts were examined after 6 days. The course of the infection in the

birds was measured daily and the gametocytes were enumerated. These appeared on the first or second day and in general fluctuated according to the parasitaemia. The number of oöcysts had little or no relation to the number of gametocytes; the oöcysts were most numerous in mosquitoes which had fed early in the infection, from 1 to 4 days (mean of 2 for the 3 species of parasite) before the crisis. The pattern of oöcyst production was much the same for the three parasites, a rapid rise in numbers followed by a steady fall, which however in the case of *P. cathemerium* rose again in the second week. This double peak occurred in both species of *Culex*, though the actual infection rates were much lower in *C. pipiens*.

Variations in oöcyst numbers according to the avian host were studied with *P. fallax*: turkeys gave the most consistent results, though guinea-fowl (the natural host of *P. fallax*) were highly efficient hosts in that mosquitoes became infected even when fed on animals in which gametocytes were invisible. The changing infectiousness of the blood bore no relationship to the numbers of merozoites produced in the erythrocytic schizonts, which actually showed little appreciable change during the course of the infection.

P. C. C. Garnham

TRYPANOSOMIASIS

In this section abstracts are arranged as far as possible in the following order:—African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed*:—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

Willett, K. C. **Sleeping Sickness in East Africa and its Treatment.** *East African Med. J.* 1955, July, v. 32, No. 7, 273–82.

This article is written for those " for whom sleeping sickness is but one of the many conditions they may have to treat ". The author outlines briefly the nature of the disease, and then deals with its diagnosis, its treatment (prophylactic and curative), and with the prognosis in treated cases. Besides drawing on his own experience he has summarized and assessed the findings of other workers in Africa.

In East Africa both *gambiense* and *rhodesiense* forms are found. These two forms may be regarded as extremes between which intermediate forms occur—perhaps every possible intermediate combination. The slowly progressive typical *gambiense* form is contrasted with the more acute typical *rhodesiense* form, and criteria by which a distinction can be made between them are given. These criteria are based on the virulence, low or high, of the trypanosome to man and to laboratory animals respectively; on the presence or absence of posterior nuclear forms; on sensitiveness or resistance to arsenical drugs; and on the species of insect vector. The criteria which can be applied to the typical forms are not necessarily applicable to the intermediate forms, but two of them—the degree of virulence and the resistance to arsenical drugs—are of importance in connexion with treatment.

The sites where trypanosomes may be found—in the " trypanosome chancre ", in glands, and in the blood—are indicated, and the importance is stressed of ascertaining, by an examination of the cerebrospinal fluid, the stage which the disease has reached. For East Africa " blood examination of all cases with suspicious symptoms, adding puncture of all glands showing

suggestive enlargement, with repetition of these examinations as necessary " is suggested as being probably the best routine. To ascertain whether the central nervous system is involved, 4 criteria can be used, namely, the cell count, the presence or absence of trypanosomes, the protein content, and the Lange colloidal gold reaction. The estimation of the protein content is regarded as being the most reliable of these, and the author follows FAIRBAIRN's classification of cases into " early ", " borderline " and " late " [this *Bulletin*, 1945, v. 42, 452]. A method of protein estimation by precipitation with trichloracetic acid is described. Sicard and Cantaloube tubes, or a modification with closer graduations, are suitable for the purpose.

Four drugs only are considered suitable for routine treatment—suramin, tryparsamide, pentamidine, and Mel B, with the equivalent or closely related preparations produced by different firms. For prophylactic treatment only two, suramin and pentamidine, are of use. Suramin, given by intravenous injection, in a dose of 1 gramme, protects a person against infection for about a month, possibly longer. Pentamidine has been used successfully in West Africa as a prophylactic against *T. gambiense* infection in doses of 5 mgm. per kgm., given intramuscularly once every 6 months. It has also been found to give some protection against *T. rhodesiense*. In Bechuanaland it has been found to be a useful prophylactic against this trypanosome for periods up to 2 months, but when the periods between the treatments were longer than this, instances of breaks-through occurred. Transient effects, similar to histamine reactions, follow immediately after the injections in a small proportion of cases. These reactions can be avoided, according to SCAILLET and HADDAD, by dividing the monthly dose into two parts [this *Bulletin*, 1950, v. 47, 453]. It is said that this division of the dose does not impair its prophylactic efficiency. There is evidence that, in some cases, *T. rhodesiense* is resistant to pentamidine: there are instances where infections with it have failed to clear up under treatment with this drug. It is reported that suramin, if used for prophylaxis in conjunction with pentamidine, " exerts a synergistic effect and prevents the reactions to pentamidine ". This method is under trial by French workers.

There are certain objections to the practice of prophylactic treatment.

Cases of *T. rhodesiense* may be resistant to pentamidine.

The shortness of the period of protection against *T. rhodesiense* militates against the practice where, as in East Africa, this trypanosome is prevalent.

Both suramin and pentamidine are excreted very slowly and there is a period when the concentration in the body is no longer sufficient to prevent infection though clinical symptoms may not be apparent yet, so that invasion of the central nervous system may take place before the infection is discovered. In Ruanda-Urundi, for instance, where the incidence of sleeping sickness (presumably the *gambiense* form) had been reduced in the ratio of 12 to 1 between 1946 and 1951, of 187 cases diagnosed in 1950, the central nervous system was already invaded in 180 of them [*ibid.*, 1952, v. 49, 378].

The opinion is recorded that, in the case of persons exposed to infection with *T. rhodesiense*, " it is better to have an overt attack which can be cured than to run the risk of the infection first presenting as an ' incurable ' one " [see FAIRBAIRN, *loc. cit.*], but conditions must be such as will ensure early diagnosis and treatment. At the same time it is pointed out that there may be circumstances in which it may be desirable to protect groups of people who are exposed to exceptional risk.

For curative treatment of early cases the drug of choice is suramin. If the diagnosis is made not later than 3 weeks (or at least not much later) after the onset of acute symptoms, before there is any, or not more than slight involvement of the central nervous system, complete cure can be certain.

There are various ways of giving the drug. That recommended is to give 1 gramme intravenously in a 10 per cent. solution in distilled water and to repeat this dose on the 3rd, 8th, 15th and 22nd days. The drug may also be given intramuscularly, but subcutaneous injections are too painful. There may be high pyrexia—105° or more—after the first injection. This reaction is not prevented by using " pyrogen free " distilled water. Slight albuminuria is frequent but is not a cause for concern.

Pentamidine is less reliable in its action than suramin. Not only may some *T. rhodesiense* infections be resistant to it but even in *gambiense* infections it is of no value once the central nervous system is involved. The usual dose is 4 mgm. per kgm. (not less) given intramuscularly either on consecutive or on alternate days until 10 injections are given. The only advantage that it is regarded as having over suramin is that, if it is given on consecutive days, the length of treatment is shorter.

Mel B, with its French equivalent arsobal, is still on trial. It appears to be much more toxic than suramin and will not replace the latter in the treatment of early cases of Rhodesian sleeping sickness. Its chief value is likely to be for cases too advanced for effective treatment with suramin. The dose is 3·6 mgm./kgm. given daily by injection for four days. After two weeks, another, similar, course may be given. Recent work suggests that suramin, given in a short course beforehand, exerts a " synergistic " action with Mel B.

Tryparsamide has been used in conjunction with suramin in borderline cases. The ordinary course of suramin is first given and a week after its completion the tryparsamide course is begun. This consists of doses of 2 to 3 grammes given weekly for 12 weeks. Optic neuritis or optic atrophy may follow this course of treatment, and it is not possible to foretell in which cases this will occur, nor is it possible to predict which cases will be cured. The results obtained with Mel B are more promising, and it may be that this drug will replace tryparsamide in the treatment of advanced cases of Rhodesian sleeping sickness.

The prognosis after treatment is shown to depend partly on the stage that the disease has reached and partly on the drugs used. While cure is certain with suramin if given during the " safe period " (*i.e.*, before the central nervous system is invaded) and somewhat less certain with pentamidine, the prognosis in the Rhodesian type has to be guarded even with borderline cases who receive either suramin and tryparsamide in combination or Mel B. A combination of suramin and Mel B, a method which is still on trial, appears from the results so far obtained to hold out more hope for advanced cases than the older treatments.

[Medical practitioners who may have to advise on prophylactic measures against infection by either *T. gambiense* or *T. rhodesiense*, or who may have to treat cases of Rhodesian sleeping sickness, should read this paper in the original.] *George Maclean*

de Freitas, G. & Hausmann, R. L. Sôbre o crescimento de *Schizotrypanum cruzi* em meios livres de proteinas nativas. [**Cultivation of** *Trypanosoma cruzi* **in Media free of Native Proteins**] *Anais Acad. Brasileira de Ciencias.* 1954, Dec. 31, v. 26, Nos. 3/4, 531–5, 1 fig. English summary.

The authors describe a new medium, DP-40, for the cultivation of *Trypanosoma cruzi*, which is prepared as follows: (1) 44 ml. of human plasma and 16 ml. of total blood are used per litre of the medium; (2) to these are added 60 ml. of water, which is allowed to boil, the mixture being

agitated until the proteins are coagulated; (3) then the mixture is cooled to room temperature, and 20 ml. of 1N HCl are added; (4) 10 mgm. of 1/5000 pepsin dissolved in 1N HCl are added; (5) the mixture is allowed to digest for 18 hours at 37°C.; (6) it is neutralized with 2N soda, added in drops, until maximum precipitation is obtained (*p*H 5·0–5·2); (7) the mixture is heated at 85°C. for 2–3 minutes; (8) its *p*H is raised to 6·7–6·8 without filtration; (9) it is then filtered, and the precipitate is discarded; (10) the fluid is brought to 1 litre by addition of modified Tyrode solution; (11) the *p*H is adjusted to 7·3–7·5.

This medium should be used 3–4 days after preparation, in quantities of 10–12 ml. for Erlenmeyer flasks, or 4 ml. for test tubes. With inocula of 10 per cent. of the volume of the medium, the yield of *T. cruzi* culture amounted to 35–55 million organisms per ml. of medium in 8–10 days.

C. A. Hoare

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

DE AZEVEDO, J. F. L'état actuel du problème du kala-azar au Portugal. [**The Present Position of Kala Azar in Portugal**] *Arch. Inst. Pasteur d'Algérie.* 1954, Sept., v. 32, No. 3, 234–54, 7 figs.

The first part of this paper is concerned with the epidemiology of kala azar in Portugal. Up to 1927 one case only had been reported; that was diagnosed in 1910 in Lisbon. Then isolated cases were reported from Oporto in the north and Coimbra in the centre of the country, but from 1938, with the establishment of the antimalarial service, numerous cases were discovered in rural districts, so that in the decade 1942 to 1951 there were 1,616 reported. The earlier cases were mostly in the north-east corner of Portugal near the Spanish frontier and the infection appears to have spread southwards, but the 2 main foci of infection are in the north and in the south at the longitudes of Oporto and Lisbon, respectively, but further inland in the former case.

The disease in Portugal shows the main characteristics of the Mediterranean type of kala azar, that is, it occurs mainly in infants, it is sporadic, and dogs are the reservoir. The author notes that there was an increase in the number of affected dogs up to 1947.

The sexes are equally affected. The highest mortality (42 per cent.) occurs in the 7-months age-group. [In a table showing the differences between Indian and Mediterranean kala azar the author gives the spontaneous cure-rate of the former as nil. This is certainly not the case; it may well be as high as 25 per cent., the higher figure he gives for the Mediterranean infection.]

The effect of climatic and telluric factors is not very clear-cut. April, May and June show the highest number of cases diagnosed, and December the lowest; allowing for delay in diagnosis, the author considers that the first 3 or 4 months of the year is the period when the first clinical symptoms most frequently appear. There is much more rainfall in the endemic areas in the north than in those in the south. The disease is more prevalent

in the inland districts in the north and in the coastal districts in the south. It occurs mainly in the plains and is rare above 200 metres above sea level.

The author discusses the points for and against the theories of transmission, by contact and by the agency of the sandfly or other blood-sucking arthropods.

In discussing the prospects of kala azar in Portugal, he points out that there has been a reduction in cases in the last decade after the recrudescence in 1944 to 1946 and that this has coincided with the more extensive use of DDT by the antimalarial service, but he does not consider that this fact is necessarily significant. Nor does he consider that this decline in numbers is necessarily reassuring, but considers that further work is urgently required to clear up a number of obscure points in the aetiology of the Mediterranean form of the disease. *L. E. Napier*

Corradetti, A. & Neri, I. Un focolaio di kala azar sul Monte Argentario (Costa Tirrenica Toscana). [**A Focus of Kala Azar on the Monte Argentario (Tuscan Tyrrhenian Coast)**] *Rendiconti Istituto Superiore di Sanità.* Rome. 1955, v. 18, Pt. 5, 376–9, 1 map.

The English summary appended to the paper is as follows:—

"At Porto Santo Stefano (Monte Argentario, Tyrrhenian Coast of Tuscany) about 20 cases of infant kala azar occurred between 1943 and 1952. Phlebotomus catches made in different localities of the Monte Argentario during the years 1953 and 1954 gave the following results: out of 1,554 phlebotomus captured, 1,547 were *Ph. perniciosus*, 6 *Ph. papatasi* and 1 *Ph. minutus*. Therefore Monte Argentario appears to be a typical zone of infant kala azar as well as the Vesuvius and Etna zones."

Veronesi, R., Castro, R. M., Marques, J. C., Fiorillo, A. M., Zucolloto, M., Czapski, J., Salles, Hilda L. B. & Amato Neto, V. Leishmaniose visceral (Calazar) no Brasil. Estudo do quadro clínico e humoral de 15 novos casos. [**Studies on 15 New Cases of Kala Azar in Brazil**] Reprinted from *Rev. Hosp. Clín.* S. Paulo. 1955, v. 10, No. 2, 86–111, 9 figs. & 3 graphs. [44 refs.]

The English summary appended to the paper is as follows:—

"The authors start with a survey of the present status of visceral leishmaniasis (kala azar) in Brasil, emphasizing the epidemic outbreak of hundreds of cases observed in Ceará State. They make a few considerations about the very important work of Deane and Deane who succeeded in establishing the complete cycle of transmission in the area studied (Ceará). They present 15 case histories and photographic material of several patients, commenting upon origin of the patient, dominant symptoms and signs, diagnostic aids, differential diagnosis, treatment and criterion of cure. In their general comments they cite the small number of cases described since 1936 in North, Central and South America, particularly in Brasil. They comment on the blood picture of the disease, both in its central and peripheric aspect as well as the contradictory theories about the mechanism of the main deviations of the blood picture. They call attention to a rare kind of ulcer on the leg of one of the patients, numerous leishmanias having been found in this ulcer which healed after therapy with an antimonial. They finally discuss the protein alterations with the aid of data obtained by electrophoresis and saline fractionation, comparing them with results reported by others. They also present photographs, photomicrographs and a diagram of the epidemiologic cycle of kala azar in Brasil."

Floch, H. *Leishmania tropica guyanensis* n. ssp. agent de la leishmaniose tégumentaire des Guyanes et de l'Amérique Centrale. [*Leishmania tropica guyanensis* **subsp. n., Causative Organism of Cutaneous Leishmaniasis in the Guianas and Central America**] *Arch. Inst. Pasteur de la Guyane Française. Publication No. 328.* 1954, June, 4 pp.

The author considers the aetiology of the different types of cutaneous leishmaniasis found in the New World, and advocates a new classification of their causative organisms. The following three types of the disease are recognized: (1) the classical muco-cutaneous form (Espundia), prevalent in Brazil; (2) the Mexican form, in which lesions are usually restricted to the ears, the infection runs a chronic course (up to 40 years), with little ulceration and few parasites, and mucous lesions are absent; and (3) the form found in the Guianas and Peru (Uta), which produces cutaneous lesions, only rarely extending to the mucous membranes. The parasites responsible for these variants are attributed to *Leishmania tropica*, which is subdivided into three corresponding subspecies: *L. tropica brasiliensis*, *L. tropica mexicana* and *L. tropica guyanensis*.

[According to this classification, the Old World type-species automatically becomes *L. tropica tropica*, possibly with at least two varieties, *major* and *minor*, if the views of Yakimoff and later Russian workers are accepted (see this *Bulletin*, 1947, v. 44, 940).] *C. A. Hoare*

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

Babudieri, B. Immunologie der Rickettsiosen. [**Immunology of the Rickettsial Diseases**] *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1955, July, v. 112, No. 3, 182–201. [35 refs.]

This lengthy paper is a concise, documented, and critical review of the literature relating to the immunology and serology of the rickettsial diseases. The author manages to maintain a fair balance between the theoretical and practical aspects of the problems with which he deals.

Although the paper can be consulted with profit by every worker on the serological diagnosis of the diseases caused by rickettsiae it also forms an excellent introduction for beginners in the study of the subject.

The general conclusion reached is that the various methods of serological diagnosis must be regarded as providing evidence deserving due consideration in conjunction with the other features of each case rather than as being definitely diagnostic tests. Examples are given to show how doubtful are the indications given by some of these tests. For instance the *Proteus OX19* agglutination reaction, though still one of the most generally useful tests, cannot differentiate between epidemic typhus, murine typhus, Rocky Mountain spotted fever, boutonneuse fever and the other varieties of tick-borne typhus fevers. Even the complement-fixation test, which is generally regarded as being specific, fails to differentiate Rocky Mountain spotted fever from rickettsialpox and gives very conflicting results with different strains of

Q fever. The author inclines to regard the rickettsia-agglutination reaction as being more selective but he admits that it has the drawback of being later in its development and in being more wasteful of costly antigen unless one of the microscopic modifications is used.

[In the abstract of the paper by Herzberg and May (below, p. 1182) there is a striking example of the complete failure of the agglutination test when one of the standard commercial Q fever antigens is used.]

John W. D. Megaw

Fox, J. P. **A Review of Experience with an Avirulent Strain of *R. prowazeki* (Strain E) as a Living Agent for Immunizing Man against Epidemic Typhus.** *Amer. J. Pub. Health.* 1955, Aug., v. 45, No. 8, 1036–48. [10 refs.]

This is a review of the 3 papers by the author and his collaborators in which their experiences of the practical application of the avirulent strain E of *Rickettsia prowazeki* as a living vaccine against louse-borne typhus are described. The last of these papers was published as recently as March 1955 [see this *Bulletin*, 1955, v. 52, 963] and nothing has happened since that time to shake the author's confidence in the safety and efficacy of the vaccine. The number of persons vaccinated in Peru is now more than 10,000. Although complement-fixing antibodies often disappear within a year, neutralizing antibodies and ability to resist challenge infection with virulent strains have persisted for at least 2 years. It is claimed that there is a sound basis for the statement that "infection with strain E can be expected to cause neither deaths nor truly serious reactions". In field conditions the occurrence of nearly 92 per cent. of sero-immune responses indicates the uniformity of the production of immunity. The optimum route of inoculation has been found to be the intramuscular one and the minimum adequate dose is between 4·0 and 5·0 log egg-infecting dose.

John W. D. Megaw

Downs, Cora M., Fevurly, J. & Meyer, Miriam M. **Studies on Hemagglutination Inhibition Phenomena. I. The Presence of Inhibiting Antigen in Typhus-Infected Animals.** *J. Immunology.* 1955, July, v. 75, No. 1, 35–42. [20 refs.]

Experiments are described which show that when suspensions of erythrocytes are treated with erythrocyte-sensitizing substance (ESS) extracted from yolk sacs infected with *Rickettsia mooseri* so that the cells have become agglutinable by homologous antisera [this *Bulletin*, 1955, v. 52, 33], the agglutination of the cells can be inhibited by the addition beforehand of the ESS to the antiserum, and that there is a heat-stable substance in infected animals' tissues which also interferes with the agglutination of sensitized cells. This heat-stable substance has been demonstrated in the tissues of mice infected with *R. mooseri*; it does not sensitize cells and does not act as a complement-fixing antigen; it is of potential interest to laboratory workers because if it were found that blood from an infected patient caused the development of the heat-stable substance, when injected into mice by the method described, its capacity as an inhibitor of haemagglutination could be applied to the diagnosis of murine typhus at a period earlier than the usual tests for the demonstration of antibodies in the patient's serum. It might also be present in the urine of patients in sufficient quantity to make it directly demonstrable and so to serve as an early diagnostic method.

Future work will be needed to determine whether the haemagglutination-inhibiting antigen will be of value in the diagnosis of human typhus fevers.
John W. D. Megaw

Salvin, S. B. & Bell, E. J. **Resistance of Mice with Experimental Histoplasmosis to Infection with** *Rickettsia typhi*. *J. Immunology*. 1955, July, v. 75, No. 1, 57–62. [10 refs.]

By an extensive series of experiments it was shown that mice experimentally infected with sublethal doses of *Histoplasma capsulatum*, given by the intraperitoneal route, acquired a high degree of resistance to lethal doses of *Rickettsia mooseri* when given by the intraperitoneal, though not by the intravenous, route. So also when *H. capsulatum* was given intravenously it gave no protection against *R. mooseri* given by either route. The maximum resistance of the mice was reached about the 8th day when the mortality rate among challenged mice fell to 13 per cent. as compared with 100 per cent. among uninoculated mice. The resistance gradually became less, and after 60 days the mortality among protected mice rose to 53 per cent. The same method gave a considerable degree of protection to mice against challenge with the toxins of *R. mooseri* contained in yolk-sac suspensions.
John W. D. Megaw

Carley, J. G., Doherty, R. L., Derrick, E. H., Pope, J. H., Emanuel, M. L. & Ross, C. J. **The Investigation of Fevers in North Queensland by Mouse Inoculation, with particular reference to Scrub Typhus.** *Australasian Ann. of Med.* 1955, May, v. 4, No. 2, 91–9.

In an investigation of the fevers of North Queensland the blood of 131 patients was studied by mouse inoculation. In all but 4 of the cases the examination was made between March 1953 and April 1954.

Blood was taken from each patient as early as possible in the illness; 2 mice were inoculated intraperitoneally and intracerebrally. The chief result was the isolation of strains of *Rickettsia tsutsugamushi* [*orientalis*] from 31 patients. Only one patient known to have scrub typhus failed to yield a strain; in this case the blood was not taken till the 16th day and only one blind passage was made, though the routine procedure was to make 2–4 such passages when no reaction occurred after the original inoculation. Isolations were made from blood samples taken from the 3rd to the 17th day of the illness. In some cases the infecting sample reacted with *Proteus OXK* at high titres such as 1 in 256 and 1 in 640.

The strains showed a wide range of virulence to mice; 13 were highly virulent, killing nearly all the mice inoculated; 14 were of low virulence killing very few of the mice; 4 showed an intermediate degree of virulence. In 8 of the 31 positive cases the *Proteus OXK* reaction remained negative in spite of repeated tests in several cases; 7 other blood samples gave reactions at low titres not exceeding 1 in 40.

Five strains of *Coxiella* [*Rickettsia*] *burneti* were isolated and at least 4 strains of *Leptospira australis*. Clinically typical cases of leptospirosis were excluded and it is stated that 26 of the patients were later shown by culture or agglutination tests to be suffering from leptospirosis. In 68 cases no infective agent was recovered by mouse inoculation; in many of these the diagnoses were of such diseases as influenza, pneumonia, hepatitis, pleurodynia, typhoid fever, measles, etc. In a few cases no diagnosis other than pyrexia of unknown origin could be made.

A detailed description is given of the pathological changes observed in mice inoculated with strains of varying virulence. One mild strain was passaged 47 times over a period of 2 years without showing any increase in virulence; there was no mortality and the only sign at autopsy was enlargement of the spleen in 57 per cent. of the mice. A typical virulent strain was repeatedly passaged by intraperitoneal inoculation of liver and spleen suspension over a period of 22 months; the mortality was 91 per cent.; there were widespread inflammatory changes in the skin of the abdomen and in the muscles of the limbs; there was a variable amount of thick fibrinous fluid in the peritoneal cavity; the pleural cavity was almost filled with watery fluid and a slight degree of splenomegaly occurred in 35 per cent. of the mice.

In one strain there was a considerable increase in virulence during passage through mice; the mortality in the first 12 passages was 10 out of 36 and from the 22nd passage onwards it was 100 per cent.

Attempts to inoculate guineapigs with infective material from mice had little success except that in a few cases there was slight fever with enlargement of the spleen and a little peritoneal fluid.

Weil-Felix reactions with *Proteus OXK* were considered significant when the titre rose to 1 in 80, but among 100 cases of leptospirosis there were 4 cases of reaction at this titre and in one case in which there had been no exposure to risk of scrub typhus there was a titre of 1 in 2,560; the patient was found to have a urinary infection with *Proteus mirabilis*.

John W. D. Megaw

Katsura, S., Katsuta, K., Tamano, Y., Kushi, J., Aoike, T., Simizu, T., Tsuruma, M., Shimada, S., Inoue, M., Kageyama, K., Kameyama, H., Sasagawa, T., Hori, H., Yamasaku, F. & Saito, H. Die Behandlung der Tsutsugamushi-Krankheit mit ganz kleinen Mengen Antibiotica unter Umgehung des Nachschubs. [**The Avoidance of Recurrences of Tsutsugamushi Disease by Treatment with very small Doses of Antibiotics**] *Ztschr. f. Hyg. u. Infektionskr.* 1955, v. 141, No. 4, 351–8. [27 refs.]

The authors have found that when the standard broad-spectrum antibiotics are given in total doses as small as 1·5 gm. spread over a period of about 3 weeks in the treatment of tsutsugamushi disease very few recrudescences occur such as are common in cases treated from the early stage of the illness by the usual doses. With daily doses starting with 100 mgm. and going on after a few days with doses of 50 mgm. the temperature usually takes 3–5 days to fall to normal; occasionally 6–7 days are needed, but relapses rarely occur and the duration of the illness is no longer on the average than it is with the larger doses. The rapid rickettsiostasis that results from the larger doses obviously inhibits the development of immunity; it is associated with arrest of the production of the *Proteus OXK* reaction and of anti-*OXK* opsonins. The system was tested on 43 naturally infected patients and on 19 cases of artificially produced attacks with varying doses of the commonly used antibiotics. The type considered most effective was chlortetracycline (aureomycin) with which 33 patients were treated with total dosages ranging from 1·1 to 2·0 gm. commencing on the 1st to the 5th day of the fever. Altogether there were only 5 recrudescences, whereas among 18 patients who were given the same total doses in the usual way 16 had recrudescences.

[For attacks of slight or moderate severity in which the diagnosis can be made within the first 3–4 days the low-dosage prolonged system of treatment has obvious advantages, but in cases in which the patient's condition indicates actual or threatened tissue damage most medical men are likely to

aim at prompt rickettsiostasis by adequate doses. When these have controlled the fever before the end of a week's illness it may be desirable to continue the treatment with small doses for a few days. Although recurrences of the fever are disappointing there are few cases on record in which they have been serious, they yield readily to antibiotic treatment and often last for only a few hours even when untreated.] *John W. D. Megaw*

Weyer, F. Über eine Laboratoriumsinfektion mit Zeckenbissfieber. [**A Case of Laboratory Infection with Tick Bite Fever (Kenya Tick Typhus)**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1955, June, v. 6, No. 2, 226–30.

A strain of the rickettsia of Kenya tick bite fever [Kenya tick typhus] was isolated from a laboratory assistant on whom lice had fed after they had been experimentally inoculated in Hamburg with rickettsiae from ticks [*Haemaphysalis leachi*] sent from Nairobi, Kenya. After an incubation period of 7–12 days the patient had a severe attack of fever which continued high for 8 days. A maculopapular eruption appeared on the 3rd or 4th day, first on the extremities and then on the limbs; it extended to the face, palms and soles. A few of the papules became vesicular, suggesting the possibility of rickettsialpox. Some weeks earlier a strain of *Rickettsia akari* was being maintained in the laboratory.

The Weil-Felix reaction was positive at 1 in 80 with *Proteus OXK* and was negative with *Pr.OX19*. Serum taken on the 16th day was examined at the Rocky Mountain Laboratory where the complement-fixation reaction for Rocky Mountain spotted fever and Kenya tick typhus was positive at 1 in 64; for rickettsialpox it was positive at 1 in 32 and a definite differential diagnosis between these fevers was not possible. A sample of the patient's serum taken on the 2nd day had been inoculated into 2 guineapigs which gave a short irregular febrile reaction and had a definite scrotal reaction. Sera of these guineapigs taken on the 19th day after inoculation gave a complement-fixation reaction at 1 in 8 with Kenya tick typhus antigen and negative reactions with the antigens of Rocky Mountain spotted fever and rickettsialpox.

Lice which were fed on the patient between the 2nd and 4th day, and 4 ticks (*Ornithodorus moubata*) which also fed on him, failed to become infected. Taking all the circumstances into account the disease was definitely diagnosed as Kenya tick typhus. *John W. D. Megaw*

Herzberg, K. & May, G., with the assistance of Gertrud Lück & Christel Jaster. Untersuchungen an einem Q-Fieber-Ausbruch des Jahres 1954. IV. Mitteilung über europäische Q-Fieber-Antigene. [**An Investigation into an Outbreak of Q Fever in 1954. IV. A Study of the Antigens of European Q Fever**] *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1955, July, v. 112, No. 3, 145–61. [12 refs.]

This is a description of a comprehensive study of the antigens of *Rickettsia burneti*, 3 strains of which were isolated from the blood of patients during an outbreak of Q fever near Aschaffenburg in western Germany. The rickettsiae were recovered from the blood of 3 patients by guineapig inoculation; in one case the blood was taken on the 3rd day, in the other 2 it was taken on the 6th day. Samples of blood were taken from 2 reacting guineapigs; with each sample 2 normal and 1 Q-fever-immune guineapigs

were inoculated; all 4 of the normal animals reacted, the 2 immune animals gave no response so that the disease was confirmed as being Q fever.

Blood from each of 2 patients was inoculated into 3 mice which were killed on the 10th day, and though there was no enlargement of the spleen rickettsiae were found in stained smears of the spleen. Suspensions of the liver and spleen of these mice were inoculated into healthy mice which developed great enlargement of the spleen, smears of which were rich in rickettsiae.

In complement-fixation tests of 9 confirmed cases of the disease the following reactions occurred:— 5 sera taken before the 8th day were negative, 2 sera taken on the 11th and 14th day were positive at 1 in 40 and 1 in 320, 2 were still negative after 19 and 24 days but one of these reacted on the 47th day at 1 in 5,120 and the other reacted on the 52nd day at 1 in 320. All the patients gave strongly positive reactions to the tests with the antigen employed; this was the Behring commercial product which contains rickettsiae of the Nine-mile and Henzerling strains. With the homologous Aschaffenburg strain of antigen the reactions were practically negative in every case.

With the rickettsia-agglutination reaction an equally surprising anomaly was observed, but in a different direction; with the Behring antigen the reactions were almost entirely negative and with the homologous strain all were positive + + to + + + at a titre of 1 in 40.

Sera of 12 inoculated guineapigs tested by the complement-fixation reaction on the 30th day gave the same anomalous reactions, all were negative with the homologous strain and 8, tested with the Behring strain, were strongly positive. By the 100th day the guineapigs reacted at moderately high titres with the homologous antigen and the titres of the guineapigs tested with the Behring strain had fallen to about the same average height as those of the animals tested with homologous antigen at this time.

Based on the above and other observations the authors conclude that positive laboratory diagnosis is possible by mouse inoculation as early as 10 days after receipt of the sample of blood; by the febrile reaction in guineapigs in 12 days; by the immunity test in guineapigs in 20 days; by a positive complement-fixation test 11–14 days after the onset of the fever and by a positive agglutination reaction 19–21 days after the onset.

The startlingly anomalous reactions described are striking examples of the need for caution in the interpretation of the responses to serological tests for Q fever. *John W. D. Megaw*

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

Lippi, M. La febbre gialla nel mondo. [**World Distribution of Yellow Fever**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1955, Aug., v. 36, No. 8, 415–38, 6 maps. [25 refs.]

The English summary appended to the paper is as follows:—

"The author after a short description of the history and of the etiology of yellow fever describes the worldwide diffusion of the disease and reviews the principal epidemics noted from 1920 to the present."

Anderson, C. R. & Downs, W. G. **The Isolation of Yellow Fever Virus from the Livers of naturally infected Red Howler Monkeys.** *Amer. J. Trop. Med. & Hyg.* 1955, July, v. 4, No. 4, 662–4.

Since July 1954 7 red howler monkeys (*Alouatta seniculus insulanus*), found dead or dying in forested areas of Trinidad, have been examined in the Trinidad Regional Virus Laboratory, Port-of-Spain. The histopathological changes observed in these animals and the laboratory techniques employed for the detection of the aetiological agent are described in this report.

The most important pathological lesion was in the liver and, on microscopic examination, this liver lesion was found to be identical with that associated with yellow fever. Yellow-fever virus was isolated from the liver of each of these 7 naturally infected monkeys and from the blood serum of 2 of these animals; yellow-fever antibodies were demonstrated in the sera obtained from 3 of the monkeys.

[During 1954 15 human cases of yellow fever were reported in Trinidad. Of that number 2, both in St. George County, had no history of direct association with forests and occurred in areas infested with *Aëdes aegypti.*]

G. Stuart

Elton, N. W., Romero, A. & Trejos, A. **Clinical Pathology of Yellow Fever.** *Amer. J. Clin. Path.* 1955, Feb., v. 25, No. 2, 135–46, 3 figs. [23 refs.]

Pathological studies were carried out in 157 cases of yellow fever during the recent outbreak in Costa Rica (1951–1953). Liver function tests were studied in 144.

The findings in 11 autopsies performed in Panama and Canal Zone are described. Acidophilic necrosis of the cytoplasm of the hepatic polygonal cells was the commonest lesion. This necrosis was not always mid-zonal. There was no selective central necrosis; the cells at the lobular periphery were least involved. Inflammatory changes and bile retention were minimal. Intranuclear inclusion bodies were not observed. The intensity of the liver lesion was maximal about the fifth or sixth day. Later than this, renal failure was the main cause of death. The renal lesion was essentially similar to "lower nephron nephrosis". There were no specific lesions in other organs. The mucosa of the stomach and upper gastro-intestinal tract was commonly haemorrhagic. The cerebrospinal fluid not infrequently contained bile.

The clinical pathology is discussed in detail:

Jaundice: In 144 cases the results of "one-minute direct" and total serum bilirubin tests could be grouped as follows: (1) In fatal cases: an increase of values was demonstrable as early as the third day. A sharp rise, largely in the one minute direct bilirubin test occurred on the fourth and fifth days, reaching a maximum on the sixth day. The most intense liver damage appeared about the sixth day, ranging from the fifth to the eighth day, after which a high level was maintained. (2) In non-fatal cases: bilirubin values were normal on the third day, clinical jaundice did not develop until the sixth day, usually with a moderate rise in the one-minute direct bilirubin. After the seventh day jaundice decreased rapidly. In a small group of patients jaundice developed late and reached a maximum in convalescence, regressing slowly thereafter up to 30 days. The authors conclude that the features of the jaundice which develops in the individual case can be used as a guide in prognosis.

Serum cholesterol, total protein, flocculation tests: In fatal cases cholesterol averaged about 140 mgm. per cent. on the third day. The corresponding figure in non-fatal cases was 169 mgm. per cent. A decline to values below normal occurred in the critical phase in both groups; high normal values developed in recovery. Total protein fell in all, especially in fatal cases. There was a rapid rise during convalescence. Flocculation tests (cephalin-cholesterol, colloidal gold, colloidal red, thymol, double-distilled water) were mainly negative in the first week, but became positive in both groups in the second week.

Prothrombin: Prothrombin times (Quick method) were useful in prognosis. In 24 fatal cases the average percentage (not later than the ninth day) was 20·2; in 62 non-fatal cases (fourth to eighteenth day) the average was 66·7 per cent. Percentages below 25 occurring between the fourth and ninth days of the illness were, with one exception, encountered only in cases eventually ending in death. Rising prothrombin figures indicated improvement in hepatic function but not necessarily recovery if renal dysfunction was present.

Serial urea determinations were of prognostic significance. In fatal cases the values rose progressively up to the seventh day and remained high until death. In non-fatal cases there was a smaller progressive rise in values to the fifth day, followed by a steady decline.

Albuminuria developed in fatal cases from the second day, in non-fatal cases by the third day. In the latter about one-third did not develop albuminuria. All fatal cases had some, always heavy on the day of death. Poor prognosis was indicated by erythrocytes in the urine. Erythrocytes were always present on the day of death.

Blood: Eosinopenia was constant in all severe cases. Counts below 50 cells per cmm. were commoner in fatal than non-fatal cases. A rise in eosinophil count was a favourable prognostic sign.

General leucopenia was pronounced in fatal cases. In some severe cases after the third day leucocytosis developed.

The onset of yellow fever was sudden, with chills, in most. Headache and backache were very common. Vomit was bile-stained in the first three days in about half of 157 cases, and bloody in 20 per cent. In some cases nausea occurred without vomiting. Bloody vomit was at first red, later black. Only two patients who died failed to vomit blood. Oliguria was observed in 30 patients, anuria in 18 of 43 fatal cases.

A slow full pulse was noted in 80 patients with pronounced dissociation of pulse and temperature. Pulse rate did not fall below 60 beats per minute.

Clinical jaundice developed progressively in severe cases. In some it developed suddenly and intensely in the last hours before death. Early development of pronounced jaundice was a bad prognostic sign.

Death occurred most commonly from the sixth to the eighth day.

The authors consider that the primary lesion is hepatitis. The most serious secondary disturbance is the appearance of renal failure.

B. G. Maegraith

Cannon, D. A. & Dewhurst, F. **The Preparation of 17D Virus Yellow Fever Vaccine in Mouse Brain.** *Ann. Trop. Med. & Parasit.* 1955, June, v. 49, No. 2, 174–82, 4 graphs. [18 refs.]

It was suggested in 1951 by the abstracter [this *Bulletin*, 1952, v. 49, 685] that a crude extract of 17D mouse-brain virus could be administered by scarification for mass immunization against yellow fever in endemic areas. This has now been accomplished by Cannon and Dewhurst who

have employed 1st mouse-brain passage from 17D yellow fever vaccine virus. The technique for preparing the vaccine and the sterility, potency and safety tests are described in detail. With regard to the last, only 3 monkeys were available (one of which was immune) for intracerebral inoculation with the vaccine. Other than pyrexia no abnormality was noted. [The authors appear to be aware that more monkeys are required for safety tests.] The vaccine keeps as well as chick-embryo vaccine. Its efficiency as an immunizing agent was tested in 360 Nigerian volunteers. The vaccine was administered by placing 2 drops of reconstituted vaccine on the deltoid region of the arm and scratching through the inoculum. The results of this trial show that this vaccine is as efficient as chick-embryo vaccine given by scarification [Dick, *loc. cit.*; Cannon and Dewhurst, this *Bulletin*, 1954, v. 51, 567]. The mouse-brain vaccine is much easier to prepare than chick-embryo vaccine and is more economical.

The objections to the mouse-brain vaccine are (i) that mouse brains may harbour a latent virus; (ii) allergic demyelinating encephalomyelitis may occur; and (iii) increased neurotropism of the 17D strain may develop. The first objection is a remote possibility and the authors find no evidence of its occurrence; French workers have vaccinated 40 million persons in West Africa with mouse-brain vaccine and no reactions due to a contaminating virus have been reported. The possibility of demyelinating encephalomyelitis is considered theoretical and academic. The third objection " may be instantly dismissed " since each batch of mouse-brain vaccine is prepared from seed which is derived from chick-embryo material. [Though this is probably correct, it might be wise to test a few batches (to begin with) intracerebrally in say 10 monkeys and compare them with controls inoculated with the chick-embryo seed vaccine.] *G. W. A. Dick*

DENGUE AND ALLIED FEVERS

Frederiksen, H. **Historical Evidence for Interference between Dengue and Yellow Fever.** *Amer. J. Trop. Med. & Hyg.* 1955, May, v. 4, No. 3, 483–91. [37 refs.]

From a review of the history of epidemics of dengue and yellow fever the author concludes that each disease has a tendency to exclude the other. Most of the evidence quoted in support of this view consists of reports of epidemics of the two diseases which succeeded each other but did not coincide. Nearly all of these epidemics occurred during the period 1828–1878 and with a few exceptions they affected places on, or near, the east coast of America and in the islands of the western Atlantic area. The usual sequence of events was that an epidemic of dengue was followed by one of yellow fever. During the pandemic of dengue in the U.S.A. in 1850–1851 yellow fever remained virtually absent from the places where epidemics had been occurring in previous years. In Charleston, for example, there were no deaths from yellow fever in 1850 or 1851 though in 1849 there were 125 deaths and in 1852 there were 310. In New Orleans there were 102 deaths from yellow fever in 1850 and 16 deaths in 1851, whereas in all the other years from 1847 to 1855 the deaths from that disease ranged from 415 to 7,910.

The author quotes the experiments of Sabin, who in 1952 reported that 6 of 7 rhesus monkeys inoculated with dengue virus, and challenged 2–3 days

later with virulent yellow-fever virus, survived, whereas 9 control monkeys inoculated only with the same dose of yellow fever virus all died. [See this *Bulletin*, 1952, v. 49, 686.] This experiment supports the conclusion of the author stated above. *John W. D. Megaw*

RABIES

Brygoo, E. R. Service de la rage. [**Anti-Rabies Work in Madagascar**] *Arch. Inst. Pasteur de Madagascar.* 1954, 15–31, 2 figs.

The subject matter of this report is dealt with in 5 separate sections. Section I is concerned with the antirabies vaccine prepared and employed since the beginning of 1954 at the Pasteur Institute of Tananarive and distributed therefrom to 8 subsidiary treatment centres in Madagascar. The vaccine consists of a 5 per cent. tissue suspension, in 1 per cent. phenolized physiological salt solution, of emulsified brain from sheep inoculated with the " Paris 54 " strain of fixed rabies virus. This vaccine mixture, after having been agitated and left for 24 hours at 20°C., is then dispensed into 5 ml. ampoules, which are kept for at least a week at +4°C. During this period of storage, which completes the inactivation of the virus, the vaccine undergoes sterility, inactivation and potency tests. As evidenced by the results of titration experiments given in the text, the finished product is of an unusually high protective value. During 1954 there were distributed 105,610 ml. of this vaccine: 44,220 ml. for the specific post-exposure treatment of man and 61,390 ml. for the immunization of animals. Prior to 1954. it is of interest to observe, specific treatment of persons at risk was by the original dried cord method of Pasteur.

Section II provides statistical data on the number of persons who received treatment during 1954, and on the results of such treatment at the Pasteur Institute and its subsidiary centres. Of the 454 persons who received treatment during that year, information is complete with respect to 445. To 396 daily treatment with 5 ml. of the vaccine for the prescribed number of days was administered; in the case of the remaining 49 treatment was discontinued or interrupted. Of the 123 persons at risk from animals proved to have been rabid at the time of biting or of close contact, 3 were bitten on the head, 2 on the body, 25 on the upper, and 11 on the lower, extremity; 82 were in close contact only. No case of paralytic accident occurred, but there was one death from rabies—this in a European who, bitten on the hand by a rabid dog and treated with 5 ml. of the vaccine on 20 consecutive days, developed the disease 10 days after the last injection, *i.e.*, 30 days after the date of the bite.

Section III outlines the various techniques, followed at the Institute, for the diagnosis of rabies in man and in animals. It also refers to an outbreak of canine and bovine rabies in the district of Diégo-Suarez during June 1954 and indicates the 9 districts of Madagascar in which, on laboratory findings, the disease has been proved to occur.

Section IV treats of the measures taken to control the spread of rabies in the dog population of the island. During 1954 the number of dogs vaccinated was 1,369, while the number destroyed totalled 7,386.

Section V gives an account of the wide distribution of rabies virus throughout Madagascar. Because of the fact, however, that there is at present no wild animal reservoir of infection and that measures can be taken

to prevent importation of the virus from abroad, it is possible to envisage the eradication of rabies from the island territory. Appropriate legislation, together with compulsory vaccination of licensed and registered dogs and destruction of all stray dogs, could readily achieve this object.

G. Stuart

Croissant, O., Lépine, P. & Wyckoff, R. W. G. Recherches sur l'ultrastructure des corps de Negri examinés au microscope électronique. [**Structural Studies of Negri Bodies by means of Electron Microscopy**] *Ann. Inst. Pasteur.* 1955, Aug., v. 89, No. 2, 183–93, 11 figs. on 6 pls.

This paper has some very beautiful electron photomicrographs of sections of the hippocampal areas from perfused mice which had been infected with "street" rabies virus. Fixation was done with neutral osmium tetroxide and sections cut with glass knives in a Minot microtome. There is no evidence that the Negri bodies consist of agglomerations of rabies virus particles, and their structure could be interpreted as an emulsion of "electron-optically dense (perhaps nucleic acid-containing) matter within the cytoplasm of the affected cells".

G. W. A. Dick

Anderson, R. K. & Cameron, J. R. **Registration without Taxation—Denver's Approach to Rabies Control.** *Amer. J. Pub. Health.* 1955, Aug., v. 45, No. 8, 1005–10, 1 fig.

Molner, J. G., Willson, R. F. & Kalish, S. **Rabies Control in Detroit.** *Amer. J. Pub. Health.* 1955, Aug., v. 45, No. 8, 998–1004, 1 fig. [24 refs.]

Nicolau, St. S., Constantinescu, N., Toma, A., Dragomir, C., Aderca, I., Duca, E. & Duca, M. L'infection rabique expérimentale au virus fixe "nervotrope". [**Experimental Infection with "Nervotropic" Fixed Rabies Virus**] *Rev. Sci. Méd.* Bucharest. 1954, v. 2, 30–64. [28 refs.]

The main results obtained by the authors from the extensive experimental work described in this article may be summarized as follows.

Consequent on its adaptation to the brain of gopher and rat, the classical (Babès) strain of fixed rabies virus experienced a marked increase in its rabigenic power—an increase evidenced by its ability, when inoculated intracerebrally into rabbits, to evoke paralysis after a very short incubation period, namely, one of 3–4 days, as compared with one of 6 days when the classical fixed virus strain was similarly inoculated. In addition to an exaltation of virulence, the virus developed a pronounced affinity for the peripheral nervous system and recovered the property of spreading along the peripheral nerves in a centripetal direction. Moreover this virus was also able to spread centrifugally—a property demonstrated by the finding that in 4 out of 5 rabbits inoculated intracerebrally with the new strain the sciatic nerve became virulent and was capable, when emulsified and injected intracerebrally into rats, of causing paralytic signs of rabies in these rats after an incubation period of 5 days.

Further, whereas the cerebral tissue of rats inoculated intracerebrally with this virus was shown to be avirulent only during the first few hours after the inoculation and to have reached a virulence of 10^{-6} for rats by the 4th post-inoculation day, the cerebral tissue of rats inoculated by the same

route with street virus failed to reveal any sign of virulence until the 7th post-inoculation day.

Again, after the sciatic nerve of one hind leg of rabbit, dog or guineapig had been resected or injected with ethyl alcohol, the virus, when inoculated subcutaneously or intramuscularly on the corresponding leg, failed to produce paralysis, but the infection was followed by the establishment of immunity in these animals, the virus having been disseminated otherwise than by the nervous route.

G. Stuart

Duca, M., Duca, E. & Nutescu, O. Cercetări asupra valorii imunizante a virusului fix (tulpina "Babeş") inactivat prin metoda electrocatadinică modificată. [**Investigations on the Immunizing Power of Fixed Virus (Babeş Strain) Inactivated by a Modified Electrocatadynic Method**] *Rev. Igienă, Microbiol. Epidemiol.* 1954, Oct.–Dec., No. 4, 68–83, 3 graphs. [10 refs.] French & Russian summaries.

The authors have carried out comparative tests of the immunizing power of a rabies vaccine in which the virus has been inactivated by exposure to silver ions. Two electrodes of pure silver, 975 and 525 sq. cm. in area respectively, were immersed in 1100 cc. of tap water, and a current of 30 amp. with a power of 70 watts was passed for 120 seconds; the product is referred to as "ionized water" [it presumably contains Ag^+ ions]. A 5 per cent. suspension of rabbit brain infected with rabies virus is made in ionized water, shaken with glass beads, stood at 20–22°C. for 24 hours with shaking for 7–8 hours, and then stored at 4°C. In tests carried out in comparison with Fermi vaccine (5 per cent. rabies brain in 1 per cent. phenol saline) 2 groups of 12 mice received 0·5 cc. of either vaccine intraperitoneally, followed by 0·5 cc. subcutaneously on the 2nd day and then 0·25 cc. from the 3rd to the 12th day, with a pause on the 8th and 10th days; intramuscular challenge with fixed virus was carried out after 22 days, and both vaccines gave protection against 16 LD50. Other batches of the new vaccine protected against 128 LD50, and gave a considerable degree of protection against intracerebral challenge. Potency was retained after storage for 125 days at 4°C. and 78 days at room temperature.

D. J. Bauer

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

Woodward, T. E. **Field Studies on Plague in Madagascar, November 1953—March 1954.** *Arch. Inst. Pasteur de Madagascar.* 1954, 67–76, 1 chart.

This is a report of the work of a Plague Research Unit consisting of Captain J. A. Hightower and Lieut. F. E. Payne of the U.S.A. Army Medical Service Graduate School and Dr. B. H. Hoyer of the Rocky Mountain Laboratory, who worked in collaboration with the French research workers and public health personnel in Madagascar from November 1953 till March 1954.

The object of the Unit was to make a special study of pneumonic plague with special reference to its clinical, pathological and epidemiological features; to investigate the problem of carriers of infection and of the immunological state of cured patients. This programme was rendered almost nugatory by the unexpected lack of cases of pneumonic plague during the period; the few cases that did occur were not admitted to hospitals in which they were accessible for investigation. Only 4 groups of persons who had been in contact with plague patients were available for study, and only 1 of these, consisting of 13 persons, had been in contact with a plague-pneumonia patient. In a thorough examination of all the contacts, including attempts to isolate plague bacilli from throat swabs, no evidence of infection could be detected.

Skin tests with plague toxin and capsular antigen were made in contacts and in 2 groups of persons, one consisting of vaccinated and the other of unvaccinated persons, but when the reactions were considered " irregardless " of the antigen employed no difference was found between the two groups and " few, if any " conclusions could be drawn from the data obtained.

From plugs of tissue, obtained by thrusting a large hollow needle into the lungs, liver and buboes of corpses of plague cases, ether-treated suspensions were made; from these it was possible to obtain evidence of the presence of plague antigens by precipitin tests with plague antisera.

Collections were made of sera from 99 convalescent plague patients, from 29 persons vaccinated with E.V. vaccine, and from 41 contacts with plague patients; these were lyophilized, and small quantities of them were merthiolated; they will be examined in plague research laboratories in the U.S.A.

A large part of the report consists of a discussion of the plague-control measures now employed in Madagascar; the system of case finding, isolation and observation of contacts, with thorough dusting of the houses in the affected area, have probably been factors responsible for the recent decreasing incidence of plague in Madagascar. There has been a rather close correlation between the intensified programme of vaccination in 1952 and 1953 and the sharp reduction in the incidence of the disease. Another factor may have been the prodigious use of DDT in the campaign against malaria; this has been associated with a reduction in the flea population.

It is pointed out that the control measures in Madagascar continue to provide a working practical model which could be employed by American groups working in areas where plague is endemic in the indigenous human and rodent population. *John W. D. Megaw*

Courdurier, J. Service d'étude et de prophylaxie de la peste. [**Annual Report of the Pasteur Institute of Madagascar for 1954. Departments of Plague Study and Prophylaxis and of E.V. Vaccine**] *Arch. Inst. Pasteur de Madagascar.* 1954, 33–8.

———————. Service du vaccin E.V. *Ibid.*, 39.

During the calendar year 1954 only 17 cases of plague were diagnosed in Madagascar; 6 of these, with 4 deaths, were bubonic; 1, which was fatal, was septicaemic; and 10, of which 7 were fatal, were pneumonic.

It has been the custom for the past 12 years to give the figures of the epidemiological year, so the following relate to May 1953, to April 1954. The total number was 97 cases of which 28 were bubonic, 46 were pneumonic and 23 were septicaemic. The number of cases was considerably less than in any year since 1934 when the great campaign of vaccination was started.

In 1954 the number of smears sent for examination was 247; of these 26 were suspicious or definitely positive. Animal inoculation for diagnosis was done in 42 cases, made up of:— sputum 4 cases (1 positive); puncture material of organs, 24 (5 positive); gland puncture material, 14 (3 positive).

Among 107,185 rats caught in Madagascar none was found infected. From 35,457 rats caught in Tananarive 7,832 fleas were collected; of these 3,428 were *Xenopsylla cheopis* and 4,309 were *Ctenocephalus canis*.

In the E.V. vaccine section 755 litres of this avirulent living vaccine were prepared and 536,146 persons out of a population of 783,912 were vaccinated.

John W. D. Megaw

Santer, M. & Ajl, S. **Metabolic Reactions of *Pasteurella pestis*. III. The Hexose Monophosphate Shunt in the Growth of *Pasteurella pestis*.** *J. Bacteriology*. 1955, June, v. 69, No. 6, 713–18, 6 figs. [10 refs.]

"*Pasteurella pestis* has been shown to contain enzymes of both the Embden-Meyerhof scheme and the hexose monophosphate shunt pathway. Evidence has been presented which indicates that the shunt pathway operates during the growth of this bacterium."

Chen, T. H. & Meyer, K. F. **Studies on Immunization against Plague. X. Specific Precipitation of *Pasteurella pestis* Antigens and Antibodies in Gels.** *J. Immunology*. 1955, June, v. 74, No. 6, 501–7, 12 figs. [27 refs.]

Experiments are described in which the diffusible antigens of different strains of *Pasteurella pestis* were studied and compared with the antigens of *Pasteurella pseudotuberculosis* by the technique of "double diffusion in gels" originally developed by Ouchterlony and by Elek [*Bull. Hyg.*, 1948, v. 23, 445; *ibid.*, 1951, v. 26, 819]. This method is based on the principle that specific antigen and antibody diffusing towards each other through a gel will form visible zones of precipitation in the gel when each antigenic fraction comes into contact with the antibody in a state of "equivalence or optimal proportions". In the simplest form of the technique a plague culture was inoculated in a ring near the edge of an agar plate and incubated for 3 days. Then 0·2 cc. antiserum in a small cup was inserted in the centre of the agar plate. In this case after incubation for 2–3 weeks the precipitation zones were visible as concentric rings, sometimes 4 in number and identified as corresponding to Fraction I, somatic 1, Fraction II and somatic 2. With one avirulent and non-toxic strain only the 2 somatic rings could be detected. With another strain which was toxic but contained very little Fraction I the 2 somatic and the Fraction II rings were formed. With *P. pseudotuberculosis* only the 2 somatic rings were formed just as in the case of the avirulent and non-toxic strain of *P. pestis* already mentioned.

For a description of the more complicated methods by which several strains can be compared on the same plate reference must be made to the paper, which is profusely illustrated.

The authors claim that the method appears to be a highly precise one for qualitative analysis of antigens and that it may be found useful for comparative studies of heterologous but closely related species and for studying the factors related to cross immunity.

[Experiments described by Ransom *et al.* (see this *Bulletin*, 1955, v. 52 627) are based on the same principle though the technique is different.]

John W. D. Megaw

Néel, R. & Girard, G., with the technical collaboration of A. Chevalier. Indications et limites de la réaction d'hémagglutination protéinique dans la peste. [**Indications for, and limits of, the Protein Haemagglutination Reaction in Plague**] *Bull. Soc. Path. Exot.* 1955, v. 48, No. 2, 139–46. [20 refs.]

The authors claim that the haemagglutination test with erythrocytes treated with tannic acid by the method introduced by Boyden [*Bull. Hyg.*, 1951, v. 26, 562] is infinitely superior in sensitivity and specificity to the classical methods of sero-diagnosis. The adaptation of this test to the diagnosis of plague has been described by Néel and Baltazard [this *Bulletin*, 1954, v. 51, 689]. The underlying principle of the method is the fixation of the protein antigens to the surface of the erythrocytes. The present paper deals with several errors of technique which may cause a loss of sensitivity in the test. Among the points emphasized are the selection of a suitable brand of tannic acid and a preliminary titration of the chosen chemical to determine the most effective degree of dilution, which is usually 1 in 15,000 to 1 in 20,000. The sensitizing solution must also be titrated.

The tanning and sensitizing process completely inhibits the natural agglutination of the sheep erythrocytes so that it is quite unnecessary to make a preliminary saturation of the sera to be tested as is done by some American workers thereby causing wastage of the serum and delay in carrying out the test.

These are only a few of the many sources of error against which detailed precautions are described. It is hoped that a standardized antigen will be prepared and made available not only for research workers but also for clinical diagnosis and epidemiological studies.

[Everyone engaged in the investigation of plague antigens must read the original paper which is a valuable contribution to the literature of the subject.] *John W. D. Megaw*

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Pollitzer, R. **Cholera Studies. 3. Bacteriology.** *Bull. World Health Organization.* Geneva. 1955, v. 12, No. 5, 777–875. [Numerous refs.]

This third part of the Monograph contains a very full account of the bacteriology of cholera except for the antigenic characters of the vibrio. The author has brought together a mass of information based on published papers which is presented with careful commentaries on the findings of the different research workers whose work is quoted. Detailed accounts are given of the morphology of *V. cholerae*, its cultural characteristics, biochemical properties, vital resistance and viability outside the body.

The paper does not lend itself to abstraction but it will form a very valuable source of reference covering as it does practically the whole literature on the subject in a manner which has not previously been attempted. The extensive bibliography which is appended will constitute a guide for those who wish to consult original sources. *J. Taylor*

Gallut, J. Contribution a l'étude de la toxine cholérique. Influence de la température d'incubation sur le pouvoir toxigène *in vitro* de *Vibrio cholerae* (Inaba). [**Studies in Cholera Toxin. The Influence of Temperature of Incubation on the Toxigenic Power** *in vitro* **of** *Vibrio cholerae* **(Inaba)**] *Ann. Inst. Pasteur.* 1955, Aug., v. 89, No. 2, 242–4.

Gallut and Jude have shown [this *Bulletin*, 1955, v. 52, 631] that the toxicity of *Vibrio cholerae* (Ogawa) *in vitro* varies inversely with the temperature at which the cultures are incubated, being greatest at 18°–20° and least at 41°C. In this note Gallut shows that this is also true of *V. cholerae* (Inaba). The toxicity of a strain of this organism, isolated on 23rd October 1954 and kept in the laboratory at 20°, was determined by the methods described previously. The toxin prepared at 20° contained 133·3 LD50 per cc., that prepared at 37° contained 43·1 LD50 and that prepared at 41° contained 2·8 LD50 per cc. The values for *V. cholerae* (Ogawa) previously reported were 50·1 at 18°–20°, 18·3 at 37° and 3·5 at 41°. The toxicity of the Inaba strain therefore varies inversely with the temperature of incubation in the same way as does that of Ogawa strains, but the Inaba strain at lower temperatures is more toxic. This confirms the clinical observation that the Inaba strains occur in epidemics with a high mortality, while the Ogawa strains are associated with endemic cholera and a reduced mortality. *C. C. B. Gilmour*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Papadakis, A. M. **Amoebiasis in Greece. Twenty Years Experience.** *Arch. Hyg.* Athens. 1954, Jan.–Mar., Nos. 1/3, 39–61. [80 refs.]

With this paper, written in Greek, the author presents a very full English summary setting out the epidemiolgy, parasitology, clinical features and treatment of amoebiasis in Greece. The period covers the first half of this century, more particularly between the wars, and with special reference to studies carried out between 1935–1952.

After a short historical introduction the author notes that amoebiasis is common in Greece, but official statistics tend to underestimate its prevalence, firstly because the disease is not notifiable and secondly because diagnosis, often made on clinical grounds, is frequently inaccurate.

There were three epidemics in different localities between 1925–1930, all water-borne. Further figures have been obtained from (a) 4 surveys in Macedonia, Athens and Peloponnese between 1933–1949, covering some 3,500 persons, (b) data from the American Mission in Greece relating to 20,000 immigrants in 1948–1952 and (c) results of routine stool examinations in the Athens area in 1937–1952. From (a) an incidence of 12·14 per cent. was obtained, from (b) it was as high as 25·30 per cent. and from (c) out of 1,226 cases positive for *E. histolytica*, 523 were found to be new infections and 703 were old; the carrier rate among these last two were 42·2 per cent. and 86·8 per cent. respectively. Multiple infections were common and it is

recorded that 60 per cent. of 346 children examined yielded 60 per cent. *Giardia*, as well as 3 per cent. *E. histolytica*.

Hygienic conditions in general are bad and lend themselves to dissemination of the disease. Amoebiasis is endemic, with seasonal peaks in summer and autumn. The disease is regarded as a major public health problem.

The technique used in the studies is described in detail.

Clinically, the disease tends to be mild with fulminating cases appearing only during epidemics. Chronic forms predominate and are often overlooked. Seven clinical varieties are described. Except in epidemics liver abscess is rare in proportion to the high incidence of infection: 147 cases were recorded in the last 20 years. Relapses are common. The difficulty of permanent cure is stressed. Emetine is used in Greece only in hepatitis and in the rare dysenteric types: for chronic cases iron, arsenic and the acridine salts are used. Antibiotics were found useful only in dealing with secondary infections.

The author believes that the only hope of cure lies in repeating treatment, whatever its form, every 6 months for at least 2 years. It is stated that in 75 cases studied, resistance to cure was found to be related to low gastric acidity and that diet should be related chiefly to protein consumption, which is normally limited among the rural people. The author has found however that when ammonia values in the stool are high, carbohydrates should predominate.

Laboratory studies indicated that all variation in size in cysts were found. A survey in Athens on 2,114 cockroaches revealed the presence of pathogenic bacteria in 14 of 205 and of *E. histolytica* cysts in 14 of 1,122 dissected.

H. J. O'D. Burke-Gaffney

Chang, S. L. **Survival of Cysts of *Endamoeba histolytica* in Human Feces under Low-Temperature Conditions.** *Amer. J. Hyg.* 1955, Jan., v. 61, No. 1, 103–20, 3 figs. [22 refs.]

Most previous investigations on the effect of low temperatures on the viability of cysts of *Entamoeba histolytica* were made in a fluid medium. Since the data thus obtained provided no information about the behaviour of cysts in faeces and in view of the importance of this knowledge for the disposal of human stools in Polar regions, the author carried out experiments on the survival of amoebic cysts in human faeces exposed to constant and fluctuating temperatures above and below freezing point. For comparison, control experiments were carried out with cysts in distilled water. A study was also made of the effect of the weight of faecal samples on the loss of heat and on the survival of cysts at low temperatures. And finally, the cysts thus treated were examined microscopically, in order to detect morphological changes in them.

In these experiments encystation was induced in cultures, and pooled suspensions of cysts were centrifuged and mixed with autoclaved human faeces. Samples of 2 gm. were placed in serum tubes, in the case of tests for the effect of temperature, or desired amounts were put in beakers, in the case of tests for the effect of the weight of faeces. The samples were put into baskets attached at different levels (to ensure different temperatures) to a stand within a deep freezer, which was kept in a cold room. After exposure to the desired temperatures for specified periods of time, whole tubes, or samples of 2 gm. removed to tubes, were placed in a water-bath at 40°C., and the thawed faeces were inoculated into culture medium in order to determine the viability of the cysts after exposure.

The results are discussed at great length, and can be summarized as follows. Both in faeces and in distilled water, cysts of *E. histolytica* survived for the longest period, *viz.*, over 62 days, at 0°C., while temperatures below freezing point were harmful to the cysts, which were killed the more rapidly the lower the temperature to which they had been exposed, irrespective of the amount of organic matter present. When the temperatures were allowed to fluctuate hourly below, or above and below, zero, the survival time for cysts was prolonged by 0·5–3·5 hours, as compared with their survival at the lower limit of the fluctuating temperature. In faecal masses of different weight, kept at −28°C., the cysts survived from 2¼ hours in 2 gm. samples to 7½ hours in 600 gm. samples. A statistical analysis showed that the survival time of cysts increased by 1 hour for every 1·9 times increase in the weight of the faecal samples, so that even in minute samples they could survive for half an hour. A study of the morphological changes in cysts exposed to freezing revealed loss of refractivity and fine granulation of the cytoplasm in the early stages, whereas after some hours the cytoplasm became shrunken and distorted, while the nuclei disintegrated. Death of the cysts appears to be due to denaturation of the protoplasmic proteins by dehydration which is brought about through crystallization of their water molecules. *C. A. Hoare*

Rungs, H. Diagnostic différentiel des formes frustes non dysentériques de l'amibiase. [**Differential Diagnosis of Aberrant Forms of Non-Dysenteric Amoebiasis**] *Maroc Méd.* 1954, May, v. 33, No. 348, 531–5. [22 refs.]

The author refers to the difficulty in diagnosis of aberrant forms of amoebiasis in which there is no history of dysentery, their protean symptomatology and their frequent complication by other syndromes.

He stresses the need for effective recognition of the parasite and advises the taking by the patient of 10 gm. of sodium sulphate for 3 consecutive days before the stools are examined. This will increase the number of vegetative forms found, although they will be very fragile.

In the present paper he excludes dysenteric forms of amoebiasis and all extra-intestinal forms. A further communication is promised dealing with entero-hepatic and other syndromes.

He discusses differential diagnosis under the headings of caeco-appendicular, colitic, anorectal, and other manifestations, and also amoebomata.

It is stressed that patients should be re-examined after treatment, to exclude any accompanying conditions which may remain.

H. J. O'D. Burke-Gaffney

Pinto, V. & Pezzullo, C. La terapia antibiotica della colite amebica. Esperienze cliniche con fumagillina. [**Antibiotic Treatment of Amoebic Colitis. Clinical Trials with Fumagillin**] *Acta Med. Italica.* 1955, Jan., v. 10, No. 1, 1–12. [74 refs.]

Entamoeba histolytica may produce infiltration and ulceration of the mucous membrane in the colon and these may be demonstrable through the sigmoidoscope; cystic and vegetative forms of the parasite may be present in the faeces, and yet symptoms in such cases may be few or entirely absent altogether. The struggle between host and parasite may stay in a state of equilibrium for a long time, the disease being mild or latent.

The authors have treated 10 patients having both symptoms and signs, including *E. histolytica* in their faeces, with fumagillin in the form of

Abbott's Fumidil capsules of 10 mgm. each. They gave 60 mgm. daily to 7 patients, 40 mgm. to 2 and 30 mgm. to 1 patient. The duration of each course varied from 12 to 20 days; but the treatment had to be discontinued on the seventh day in one case owing to intolerance. The authors publish clinical notes on each case. Eight of the patients showed an immediate response. The partial failure of the drug in one case is now believed to have been due to a rectal polypus which has been diagnosed since.

The authors were able to follow up 7 of these patients. Three had a relapse after 1, 6 and 8 weeks respectively; the other 4 have remained well and the parasite has not reappeared in the stool. Two of the patients tolerated the drug well in spite of having some hepatic insufficiency. Five complained of anorexia, 4 of asthenia, 3 of nausea, one of abdominal pain and another of diarrhoea; 3 showed a lowering of the blood pressure.

Many Italian workers believe that the beneficial action of such antibiotics as aureomycin and oxytetracycline in amoebiasis is exerted indirectly on the bacterial flora with which the amoeba thrives in symbiosis, and they think that this may account for the frequency of relapses. Pinto and Pezzullo believe that fumagillin, which is made from cultures of *Aspergillus fumigatus*, exerts a direct amoebicidal action in the human intestine.

J. Cauchi

Brem, T. H. **The Use of Hepatic Function Tests in the Diagnosis of Amebic Abscess of the Liver.** *Amer. J. Med. Sci.* 1955, Feb., v. 229, No. 2, 135–7. [16 refs.]

The author, who is Professor of Medicine at the University of Southern California, Los Angeles, refers to the frequent difficulty of diagnosis of amoebic abscess of the liver. While liver function tests have in general been held to be not diagnostic the author is surprised that the serum alkaline phosphatese test has not usually been included among them in view of the finding of Gutman *et al.* (*J. Clin. Invest.*, 1940, v. 19, 129) that this test was positive in 9 cases of liver abscess of varying aetiology. He now reports 10 cases of amoebic abscess of the liver in which he used the cephalin cholesterol, thymol turbidity, serum bilirubin or icterus index, serum alkaline phosphatase, and bromsulphthalein retention tests. Serum albumin and globulin levels were also studied.

All the tests were negative or insignificant, except the alkaline phosphatase and bromsulphthalein. In the former, 9 units per 100 cc. is said to be upper limit of normal, but the author found that values of 8 units were invariably pathological.

In 8 of the cases studied, the serum alkaline phosphatase activity was raised in 5 and slightly raised in 2 (range 8·3–26 units). In 8 cases the bromsulphthalein test showed abnormal retention in 5.

This combination is somewhat unusual in the absence of jaundice and other evidence of cellular dysfunction, though it has been found in metastatic carcinoma of the liver without hyperbilirubinaemia. The reason for this divergence of liver function tests seems to be partial obstruction of the intrahepatic biliary system, without extensive cellular damage. This pattern is therefore usually seen in " space occupying lesions within the liver ". The degree of abnormality of these 2 tests is roughly proportionate to the extent of the lesion. Conan [this *Bulletin*, 1950, v. 47, 40] found the alkaline phosphatase test normal in amoebic hepatitis but increased in a case of large abscess. The two tests were not however invariably complementary in the present series, so that both should be used in doubtful cases.

The author does not claim that these tests will help materially in identifying amoebic hepatitis or small abscesses, but the pattern may be of considerable value in differentiating " the full blown lesion from many other intra-abdominal or intrapleural diseases " which may cause confusion.

H. J. O'D. Burke-Gaffney

Schaible, G. Resochin in der Behandlung von Amöbenhepatitis und Leberabszess. [**Resochin (Chloroquine) in the Treatment of Amoebic Hepatitis and Liver Abscess**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1955, June, v. 6, No. 2, 187–92. [11 refs.]

Some 33,000 patients were treated in North Sumatra in 1954 and among them 2·8 per cent. were found to harbour *E. histolytica* or its cysts.

In one big series of 3,000 patients in 1954, it was possible to diagnose amoebic hepatitis clinically in 56, or 1·8 per cent., but only in a quarter of this number (14) could amoebae be actually demonstrated. The acute stages of amoebic dysentery were treated successfully with emetine combined with carbarsone or Yatren.

On the other hand, emetine and Resochin appeared to exert little influence upon the dysenteric syndrome, but when the liver was enlarged better results were obtained. In 1954 it was resolved to treat all hepatic cases on these lines. In all, 64 patients were subjected to the method. In two days it was possible to observe improvement. This was specially noticeable in those with referred shoulder pain.

As a routine 40 tablets of Resochin (0·25 gm.) were given and 6–8 injections of emetine, each of 0·06 gm. This amount usually sufficed to ensure a cure. In 34 cases of hepatic abscess the results were highly gratifying and in 16 instances surgical intervention, which appeared inevitable, was avoided.

In 14 who came to operation this combined therapy was effective in reducing the size of the liver and diminishing the flow of pus.

It is claimed that the emetine-Resochin combination is the best for the extra-intestinal complications of chronic amoebiasis. *Philip Manson-Bahr*

Gambardella, A., Digilio, V. & Tedeschi, G. Intossicazione acuta e cronica da clorochina. (Ricerche sperimentali sul coniglio.) [**Acute and Chronic Poisoning with Chloroquine. Research Experiments in the Rabbit**] *Acta Med. Italica.* 1955, Jan., v. 10, No. 1, 12–20, 12 figs. [29 refs.]

One of the 3 authors of this paper has treated a patient with chloroquine for a liver abscess which had resisted emetine and ruptured into the pleural cavity, 2 other patients for amoebic hepatitis and 10 for amoebic colitis—all ending in recovery. In this paper the authors report on experiments which they have carried out on 20 rabbits, each averaging 2 kgm. in weight. They used Bayer's chloroquine, which is put up in phials of 5 cc. each containing 0·15 gm. of the base, which they injected intramuscularly.

Acute poisoning was studied in 10 rabbits. Some were given an injection of 3 cc., equivalent to 0·09 gm. of chloroquine base, and died within 15 minutes. Others were given 0·5 cc. doses at 10 minutes' intervals; they developed a mydriasis and contractures of the muscles, more especially of the posterior regions, by about the 5th or 6th injection and died about 5 minutes later without showing any convulsions. The post-mortem findings are briefly described.

The other 10 rabbits were given a daily dose of 1 cc., which they survived: 5 were killed after one month of this treatment and the others after 2 months.

The authors have observed no characteristic pathological changes in any of the rabbits and they suggest that the disturbances of the blood system and other cellular changes which have been reported in human cases of chloroquine poisoning must be due to some individual traits which lead to temporary biochemical changes. *J. Cauchi*

Chenau, U. A. Presencia de *Giardia lamblia* en la vesicula biliar humana. [**Presence of** *Giardia intestinalis* **in the Gallbladder**] *Semana Méd.* 1955, July 21, v. 107, No. 3, 149–54. [23 refs.]

The English summary appended to the paper is as follows:—

"We have investigated what part the parasite *Giardia lamblia* plays in the genesis of cholecystitis. In order to accomplish this we have performed a careful parasitological search of the content of 167 surgically cut out gallbladders belonging to adult persons of both sexes who suffered cholecystisis.

"At the same time we have carried out identical task with the bile obtained from 293 persons suffering the same illness, using the Meltzer-Lyon method of duodenal drainage.

"Trophozoites of *Giardia lamblia* were found in very limited quantity (frequency 0·59%) and in only one of the examined gallbladders. Before this gallbladder was removed from the patient, the parasite was very evident in A bile, but, hardly noticeable in B and C bile, the bile being obtained by the Meltzer-Lyon method.

"Cysts of *Endamoeba histolytica* were found in the gallbladder content of two patients.

"Trophozoites of *Giardia lamblia* were observed in 18 of the 293 persons whose bile was obtained by means of a duodenal tube, hence the infestation index found was 6·14%.

"The amount of this parasite that appeared in the first parts of the bile (A bile), was greater than that found in the second and third part (B and C bile).

"Eggs of Fasciola hepatica were found in the bile of two patients belonging to this group.

"The results obtained, and especially the great difference between the infestation index by *G. lamblia* found in the gallbladder content and that verified in bile obtained by the Meltzer-Lyon method, lead us to the conclusion that the part played by this parasite in the genesis of cholecystitis is of no importance since it invades the gallbladder very rarely and to no great extent."

RELAPSING FEVER AND OTHER SPIROCHAETOSES

Baltazard, M., Bahmanyar, M. & Chamsa, M. Sur la fièvre recurrente en Afghanistan. [**Relapsing Fever in Afghanistan**] *Bull. Soc. Path. Exot.* 1955, v. 48, No. 2, 159–61.

Sporadic outbreaks of relapsing fever in Afghanistan have been recorded from time to time, in addition to the louse-transmitted form which disappeared after the last great pan-epidemic. One of the authors in the course of a recent mission to Afghanistan collected 13 adult *Ornithodorus tholozani* var. *pavlovskyi*, from the neighbourhood of Kabul, and 3 of these when fed

on a new-born rabbit produced a spirochaetal infection which was identified as *S. persica.*

It is well known that this spirochaete develops well marked local races which are transmitted with difficulty, or not at all, by *Ornithodorus* from other localities and a single attempt to infect *O. tholozani* var. *typicus* from Persia with this strain of *S. persica* resulted in only 3 out of 11 becoming infected. *Edward Hindle*

Davis, G. E. **Relapsing Fever Spirochetes: the Present Status of** *Borrelia venezuelensis* **Brumpt and** *Borrelia neotropicalis* **Bates and St. John.** *Internat. Bull. Bact. Nomencl. & Taxon.* 1955, July 15, v. 5, No. 3, 107–9.

Spirochaeta neotropicalis was the name given to the causal organism of relapsing fever in Panama transmitted by the tick *Ornithodorus talaje*, and *Treponema venezuelense* to the spirochaete transmitted by *Ornithodorus rudis*. In modern taxonomic schemes both species of spirochaete are included in the genus *Borrelia*. In this paper Davis shows that by misidentification of ticks in Panama, the one identified as *Ornithodorus talaje* was in fact *O. rudis*, and consequently the spirachaetal names *Treponema venezuelense* and *Spirochaeta neotropicalis* are synomyms. Davis also investigated the priority of the specific epithets, and decided in favour of *Borrelia venezuelensis* Brumpt. *S. T. Cowan*

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:—Trematodes (*schistosomes, other flukes*); Cestodes (*Diphyllobothrium, Taenia, Echinococcus, other cestodes*); Nematodes (*Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.*).

Hackett, C. J., with Buckley, J. J. C. & Murgatroyd, F. **Manual of Medical Helminthology.**

This book is reviewed on p. 1246.

Davies, A. M. [**Preliminary Account of an Outbreak of Bilharzia in the Beth-Shean Valley**] *Harefuah.* Jerusalem. 1955, July 1, v. 49, No. 1 [in Hebrew 9–10. English summary 10–11].

The English summary appended to the paper is as follows:—

" 1. The diagnosis of schistosomiasis haematobium in a boy of 10, born in and living in Kibbutz Tirat-Zvi, led to a systematic examination of all inhabitants of the kibbutz with the result that 97 (21·5%) were found to be infected. Almost all of the cases were in persons below the age of 20.

" 2. It is almost certain that the infection was contracted in the swimming pools of the kibbutz during or at the end of last summer. The high ambient temperature (35°C.) of the Jordan Valley in summer makes swimming one of the necessities of life. Intimate contact with nearby

settlements of new immigrants from Iraq and Iran probably provided the initial infestation of the swimming pools.

" 3. The clinical picture as seen in Tirat Zvi was extremely mild and the majority of the cases were and have been completely symptom free. Only 4 children suffered from abdominal pains, 6 showed macroscopic haematuria and none suffered from urticaria. Results with a specific skin test were disappointing, only 41% of cases could be diagnosed in this way. Methods of diagnosis and treatment are discussed.

" 4. Children and adults of surrounding villages and kibbutzim were surveyed using the skin test and there is reason to suspect that other, autochthonous, foci of infection now exist in the Beth-Shean Valley.

" 5. It is not known why the disease has taken 7 years (since the foundation of the State and mass immigration of Near Eastern populations) to appear in epidemic form, but the present outbreak demonstrates the validity of the fears that have been expressed by several authors. An intensification of the program of snail eradication is urgently called for and it behoves each practitioner to be on the look out for the disease in his patients."

Annecke, D. H. S. **Bilharzia in Transvaal.** *Pub. Health.* Johannesburg. 1955, Jan., v. 18, No. 1, 2–7, 1 map. [In Africaans.]

The author deals with the geographical distribution and the intensity of human schistosomiasis in the Northern and North-Eastern Transvaal. By means of a map with different shadings he indicates the rates of infections due to *Schistosoma haematobium* among African children attending schools in different parts of the Northern Transvaal. Shadings indicating infection rates of below 10 per cent., 10 to 25 per cent., 25 to 40 per cent., 40 to 60 per cent. and above 60 per cent. are shown.

Table I shows the infection rates with *S. haematobium* and *S. mansoni* in the age-groups 1–4, 5–9, 10–14, 18–19, 20–29, 30–39, 40–49 and above 50 years, from various parts in the Letaba district. This examination included Africans living on European-owned farms and in Native Reserves. Tables II and III give the infection percentages in the various age-groups in Native Reserves and on farms, respectively, in the Nelspruit district.

Although the infections due to *S. haematobium* were only slightly higher in the Africans on the farms compared with those living in the Reserves, the incidence of *S. mansoni* on the farms was 68·5 per cent. as against 33·4 per cent. in the Reserves. In the age-group 1–4 years, the *S. mansoni* infection was detected in 78·9 per cent. of the farm children as against 20 per cent. in the Reserves.

Tables IV and V give the monthly infection rates in *Physopsis* and *Planorbis* species in the Nelspruit district and Letaba district, respectively. No distinction was evidently made between snails collected off the farms or from the Reserves. Only full grown snails were examined, because according to the author small snails are not infected. [Many laboratory workers will disagree with this statement.] The recovery of schistosome cercariae from *Physopsis* throughout the year forces the author to accept the view that infection of man can take place all the year round. [The presence of schistosome cercariae of animal origin was evidently overlooked.]

The article draws attention to the prevalence of schistosomiasis in the Transvaal and the dangers associated with the rapid development of irrigation in the Low Veld.

The author reports that attempts are being made to control schistosomiasis in the Transvaal and in Natal by reducing the numbers of vectors. Complete eradication of the vectors will not be attempted. A water biologist and a malacologist have been appointed to assist in the fight against schistosomiasis. A chemist will be appointed in the near future.

P. L. LeRoux

Ragheb, M., Erfan, H., El Deeb, A. & Mahfouz, M. **Radiological Study of Hepatic Bilharziasis.** *J. Egyptian Med. Ass.* 1955, v. 38, No. 3, 159–65. [16 refs.]

Hepatic fibrosis with hepatosplenomegaly due to visceral schistosomiasis is the most chronic endemic condition in Egypt; it is primarily due to deposition of schistosome eggs in the portal tracts. Coarse cirrhosis is due to their lodgment in the large, and fine cirrhosis to that in the small, portal channels. Splenomegaly is caused by portal obstruction and by reticulo-endothelial reaction in the spleen produced by toxins from the worms and by the lodgment of eggs there. When there is fibrosis in the liver the organ is either normal in size or shrunken, the spleen usually is enlarged and its capsule is thickened and adherent to neighbouring structures. The splenic vein is thickened, often tortuous, and it may show thrombotic changes (2·5 per cent. of cases); the splenic sinusoids are dilated and are thickened by fibrosis. The intestinal tract is involved in all the early, and in three-quarters of late, cases.

Radiology of the portal system and percutaneous splenic venography facilitate the examination of the portal system, of the liver and spleen, and of the gastro-intestinal tract. Abdominal aortography gives poor definition of the hepatic artery and its interparenchymal branches. Venography of the venous afferent system of the liver, done during laparotomy, gives satisfactory results. By these means evidence is forthcoming that the splenic and portal veins are enlarged, angulated and tortuous; the main intra-hepatic branches have a wavy contour and interrupted course; collateral veins run to the stomach and oesophagus, and in the latter region they are broad; the intra-hepatic branches are irregular in size and diminished in number, and they end in rich plexuses of very small diffusely-distributed vessels.

Cases of schistosomal liver cirrhosis can be divided into early, moderate and advanced types. In the early type the splenoportal angle can be seen to be more or less acute and the liver hilum is not much displaced. Venography may show tortuosity of the main large intra-hepatic branches; the moderate-sized vessels are tortuous, have a wavy contour and irregular lumen, and are asymmetrical; the peripheral vessels are ill-defined, and blushing is irregular and prolonged. Few, or no, collateral veins are seen, and this condition is encountered chiefly in children and not in adults.

In the moderate type there is a reduction in the liver size with a blunt spleno-portal angle. The liver hilum is retracted laterally; the main vessels are dilated at the hilum; the medium branches are fewer, irregular in lumen and contour; the smaller branches are difficult to see owing to blotchy liver opacification.

In the advanced type the spleen shadow fills the upper and lower left abdomen, displacing the colon and the stomach. The liver shadow is small and high, and its hilum is retracted laterally and upwards. The medium and smaller branches cannot clearly be seen owing to prolonged blotchy opacification of the liver in indistinct rounded shadows; blushing never reaches the periphery of the liver.

Prolonged blushing indicates stagnation of flow; sacculation of the intrahepatic portal branches is seen in atrophic lesions. Vascular shadows in the upper liver area, leading towards the hilum of the lungs, suggest porto-systemic-pulmonary collateral circulation. In one case there were shadows of communication between the left portal branch and umbilical veins.

A. R. D. Adams

WALT, F. **The Katayama Syndrome.** *South African Med. J.* 1954, Jan. 30, v. 28, No. 5, 89–93.

The name Katayama disease was originally given to the invasive stage of *Schistosoma japonicum* infection, but is here applied to the similar clinical condition occurring in the other two forms of human schistosomiasis; and the author equates it with Group I of GELFAND's classification [this *Bulletin*, 1943, v. 40, 398].

He describes in this paper 12 cases seen in Durban in 18 months between 1951–1953. The condition is commonest in male children and all his patients were in fact European boys aged 5–11 years. There was usually a history, direct or inferred, of having bathed or fished in a nearby river, and although there was a seasonal incidence in the summer rainy months between October and May, this seems more likely to be due to the boys exposing themselves to infection in the summer months than to a meteorological factor as such.

The usual clinical features were characteristic—evening temperature and headache, abdominal pain, transient, generalized urticaria (absent in 5 cases), transient and variable cough and poor appetite. The liver and spleen were enlarged in 5 cases each, but in only one were both organs enlarged. The incubation period was between 2 and 8 weeks and there was an impression that it was shorter in *S. mansoni* infections.

A striking feature was the eosinophilia which was as high as 80 per cent., and this feature may raise a suspicion of the disease. It may be absent in the very early stages causing it to be missed unless blood examination is repeated. A table illustrates this point clearly.

In 2 cases, *S. haematobium* ova were found in the urine and on cystoscopic examination, in 1 they were found by cystoscopy only, in 5 *S. mansoni* ova were found in the stool, in 2 both schistosomes were found, and in 2 no ova were detected and diagnosis was made on the clinical picture and eosinophilia. The clinical picture was the same in both infections. Visible haematuria was not a feature of any case. The cercarial antigen skin test was always negative and was discarded. The complement-fixation test was used in only one case: it was negative on the 25th day, but was positive 3 months later. The value of rectal biopsy is stressed.

The clinical features and diagnostic criteria in all 12 cases are shown in 3 tables and 5 cases are described in detail. Treatment varied and conventional methods were tried. Because treatment by intravenous antimony tartrate is impracticable in young children in out-patient departments, Nilodin was used but proved to be unsatisfactory in the recommended dosages in established cases of *S. haematobium* infection. The author therefore gave larger total doses of about 100 mgm./lb. body weight. Children below 8 years are now given 600 mgm. Nilodin daily for 8 days, and older children 800 mgm. A series (to be published) has given encouraging results. In the case of *S. mansoni* infection the author considers that for the present Nilodin 'by mouth followed by intramuscular antimony is probably the safest combination: it probably needs to be repeated.

The author notes that while *S. haematobium* infection is endemic in Natal and other parts of South Africa, *S. mansoni* used to be considered rare. He

now points to the increased incidence in his hospital since 1951 and states that " now the Katayama syndrome has become more common than typhoid or tick-bite fever ". He points out that to wait for the presence of ova in the excreta may postpone the diagnosis even for months. In many cases, therefore, this early phase was unrecognized, particularly as it is commoner to see a patient with haematuria or mucus diarrhoea than with the Katayama syndrome; but not every patient develops this syndrome.

The author believes that the clinical picture of the toxaemic stage of schistosomiasis is recognized fairly easily and that this Katayama syndrome should be considered when an unexplained fever presents in areas where schistosomiasis is endemic. In this way, early diagnosis and treatment may be established. *H. J. O'D. Burke-Gaffney*

El-Zawahry, M. **Schistosomal Granuloma of the Skin.** *Arch. Dermat.* 1955, July, v. 72, No. 1, 68–9, 1 fig.

Skin lesions in schistosomiasis are often overlooked, but they may provide the presenting sign of serious systemic involvement and even, on occasion, the earliest opportunity of diagnosis.

The early manifestations are due to cercariae and may take the form of a local reaction (swimmer's itch) or an allergic reaction on repeated exposure. The late manifestations are caused by ova or their products and produce either schistosomal granuloma or allergic reaction (Katayama disease).

The author, in Cairo, has studied 10 cases of schistosomal granuloma in the last 10 years. They were papillomatous, vegetative masses, largely in the perianal and genital regions. They were late lesions, in which ova were found histologically. Eight of the cases were in girls and labia majora were usually affected (in rural parts of Egypt, the labia minora are frequently removed by circumcision).

The lesions varied in size from a few millimetres to several centimetres in diameter. Clinically they were warty, cauliflower-like lesions, without symptoms. Elephantiasis and ulceration sometimes developed. The author refers to a boy of 8 with warty masses on the penis and scrotum: ova were found by biopsy and also on examination of the urine. The masses were diminished in size to minute fibrotic nodules as a result of treatment.

Treatment took the form of administration of tartar emetic and Fuadin; in only two cases did this fail and then surgical intervention was required.

The differential diagnosis of schistosomal granuloma includes condylomata, carcinoma, cutaneous amoebiasis, syphilis and haemorrhoids.

The author refers to the histological appearances of these lesions described by Brackett [this *Bulletin*, 1941, v. 38, 378].

H. J. O'D. Burke-Gaffney

Payet, M., Berte, E., Camain, R. & Pene, P. Accidents cardiaques aigus de la bilharziose à *Schistosoma haematobium* à propos de deux observations. [**Two Cases of Acute Cardiac Manifestations of** *Schistosoma haematobium* **Infection**] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 5, 688–92, 6 figs. on 3 pls. [19 refs.]

The authors, from Dakar, refer to the various records of cor pulmonale in the literature, with which readers of this *Bulletin* will be familiar.

They then refer to 2 cases of acute right-sided cardiac insufficiency in patients aged 14 and 19 years respectively, the first dying the day after admission, the second after 20 days. The clinical features are described in detail. These manifestations included dyspnoea, cyanosis, painful

enlarged liver, oedema of the lower limbs, turgid jugular veins and eventually cardiac failure. Both showed evidence of lung involvement and at autopsy, eggs of *S. haematobium* were found either as emboli in the smaller pulmonary vessels or as clusters in follicles in the indurated lung. In the first case, the density of eggs was very great: in one section of lung 1·5 cm. × 7·5 μ, as many as 90 eggs were seen. Such cases of pulmonary involvement are usually chronic and the authors note the rarity of acute cases like the present one. Possibly previously undetected myocardial lesions were aggravating factors.

The authors point out that even if such cases are recognized during life, treatment must be palliative, as specific medication for schistosomiasis would seem to be contraindicated in them. *H. J. O'D. Burke-Gaffney*

Bataillard, M. Essai de traitement de la bilharziose vésicale par un ascorbo-hypophosphito-antimonio-tartrate de calcium et de potassium. [**Trials of " 1-Ascorbo-Hypophosphito-Antimonio Tartrate de Calcium et de Potassium " in Urinary Schistosomiasis**] *Bull. Soc. Path. Exot.* 1955, v. 48, No. 2, 192–5.

At Marrakesh 20 Moroccans, between 7 and 17 years old, suffering from *Schistosoma haematobium* infection have been treated with this drug, also known as AB5 [see this *Bulletin*, 1955, v. 52, 378]. Some of them had previously been treated unsuccessfully with anthiomaline. Treatment with the compound under test lasted for 5 days and consisted of intravenous injection daily of 5 ml. of solution, and an oral intake of 2 " tablets " [doses not stated], for persons weighing under 40 kgm.; and an injection of 10 ml. together with 3 tablets orally for those above this weight. The injections caused nausea and vomiting, and a dry cough with salivation and general malaise; while the oral dosage caused no trouble. These side-effects were not relieved by giving antihistaminics. Escape of the solution into tissue caused severe and long-continuing irritation. The immediate results were considered excellent in so far as the disappearance of symptoms and signs, and of eggs from the urine, was concerned; the long term results were less satisfactory. Of 18 patients apparently cured 16 were reviewed 3 to 6 months later; only 11 of them were still free from signs and of eggs in the urine.

Schneider, in comment, said he also had handled this drug [AB5], the chemical constitution of which had not clearly been stated by the makers. He had determined its toxicity for rabbits, rats and dogs, and the recommended dosages for injection seemed to be much below the doses causing toxicity. He had employed the makers' dosage for the treatment of 5 adults with *S. haematobium* schistosomiasis, and found it to be badly tolerated, and to cause the changes in the electrocardiographic records usual under antimony treatment. The immediate results of the treatment were good; but 4 of the 5 patients were found not to be sterilized of their infections on further observation, and their symptoms and signs recurred.

A. R. D. Adams

Bueding, E. & MacKinnon, Joan A. **Hexokinases of** *Schistosoma mansoni*. *J. Biol. Chem.* 1955, Aug., v. 215, No. 2, 495–506, 3 figs. [36 refs.]

———— & ————. **Studies of the Phosphoglucose Isomerase of** *Schistosoma mansoni*. *J. Biol. Chem.* 1955, Aug., v. 215, No. 2, 507–13, 1 fig. [15 refs.]

Bellon, J. Essai de traitement de la bilharziose intestinale par l'oxyde stanneux. [**Trials of Stannous Oxide in the Treatment of Intestinal Schistosomiasis**] *Bull. Soc. Path. Exot.* 1955, v. 48, No. 2, 197–201.

After malaria and amoebiasis, schistosomiasis is the most important parasitic disease of man; its treatment bristles with difficulties. The antimonials are difficult to give and are toxic; the thioxanthones are costly and also are toxic; the piperazine derivatives are unsatisfactory.

Stannous oxide is easy to give by mouth, and a course of treatment with it is of only 8 days' duration [see this *Bulletin*, 1952, v. 49, 281; 1954, v. 51, 1174], though repeated courses of treatment with it may be necessary.

Ten ambulant African patients in French Guinea, all with *Schistosoma mansoni* infections, were treated orally with 4 gm. of stannous oxide (Bilharstan) over 8 days in the case of adults, and with lower doses in the case of children. Symptoms rapidly lessened in each instance, and the stools became negative in more than half of the patients and remained negative for periods of observation up to a maximum of 3 months. If these results are confirmed, stannous oxide would seem to be the drug of choice for the treatment of intestinal schistosomiasis in primitive races.

A. R. D. Adams

Kiehl, P. V. & Mitchener, J. S., Jr. **Schistosomiasis of the Colon treated by Resection.** *U.S. Armed Forces Med. J.* 1955, July, v. 6, No. 7, 1053–7, 3 figs.

A Puerto Rican, aged 30, gave a history of intermittent rectal bleeding of one year's duration. *Schistosoma mansoni* eggs were found in biopsy specimens from the rectum. On sigmoidoscopy a large polypoid granuloma, and multiple pseudopolyps, were seen about 6 inches above the sphincter. Stibophen treatment did not alter the condition, so a resection of 9 cm. of the affected bowel was undertaken and the gut was reunited by a two-layer anastomosis.

[To what extent the patient would benefit from this, in the absence of effective specific treatment, is not made clear.] *A. R. D. Adams*

El-Gindy, M. S. **The Life Cycle of a Schistosome liberated from the Snail *Pyrgophysa forskali* (Ehrenberg).** *J. Egyptian Med. Ass.* 1955, v. 38, No. 3, 166–70.

Leiper [this *Bulletin*, 1915, v. 6, 437] failed to find schistosome cercariae in the snail *Pyrgophysa* [*Bulinus*] *forskali*, but reported that the miracidia of *Schistosoma haematobium* are attracted to this snail. Adams [*ibid.*, 1934, v. 31, 774, and 1936, v. 33, 94] infected *P. forskali* with miracidia of *S. haematobium* derived from man in Mauritius, cercariae derived from these snails subsequently providing adult *S. haematobium* when they were introduced percutaneously into white mice. *P. forskali* could not be infected in the Belgian Congo, but it is a vector in Tudum Wada, near Kaduna, N. Nigeria, and is suspected to be a vector in Portuguese Guinea. It is often found with *Bulinus truncatus*, the known Egyptian vector of *S. haematobium* in Egypt, where both snails need a slight water current, minimum pollution, aquatic vegetation and low salinity. *P. forskali* is seldom found with *Planorbis boissyi*, the intermediate host of *S. mansoni*. The author found *P. forskali* in shallow water in which water-grass (*Echinochloa stagnina*) and a film of algal growth were present. He

collected 1,666 individuals of *P. forskali* from 25 streams, including main canals and branch drains in 4 different Egyptian provinces. He exposed 200 young snails collected to infection by putting them in aquaria in Nile water into which the urine sediment of patients infected with *S. haematobium* had been poured, but 14 days later all these snails had died.

The old snails collected, 1,466 in all, were each crushed on a slide and 7 contained schistosome cercariae, an infection rate of about 5 per 1,000. Four of these infected snails came from a stream in which infected *Bulinus truncatus* infected with *S. haematobium* had been found. There were no *B. truncatus* in the stream in which the other 3 infected snails were found.

The cercariae found were stained intravitally with neutral red and Nile blue sulphate and they conformed morphologically with cercariae of *S. mansoni* and *S. haematobium*. They were similar in size and each had an apharyngeal gut, a bifurcated tail, 5 pairs of penetration glands and no eye spots. The tail moved like a spindle on its longitudinal axis and the body revolved.

Cercariae from 2 naturally-infected *P. forskali* were injected intraperitoneally into 2 gerbils, but 98 days later no schistosomes were found in the gerbils. But, when a white mouse was exposed to percutaneous infection with cercariae from 2 naturally-infected *P. forskali*, 2 male schistosomes, one immature and one mature, were found in the liver 43 days after infection. Another white mouse exposed to percutaneous infection from 3 snails, died 56 days later and in its liver 3 mature male schistosomes were found. Pigment masses were found in its blood system, but eggs were not found. The worms found had an apharyngeal gut that bifurcated near to the ventral sucker into two intestinal caeca which reunited posteriorly as they do in *S. haematobium*; there was a small, funnel-shaped oral sucker and a round ventral one and the body formed a gynaecophoric canal. Two of the mature males had 4 testes and the other had 5.

The author concludes that the cercariae and flukes belong to the family Schistosomatidae and the subfamily Schistosomatinae and the genus *Schistosoma* and that the species belongs to "Group II" described by Schwetz [*ibid.*, 1952, v. 49, 782] to which group *S. haematobium* belongs. He thinks that the flukes were *S. haematobium*, but, in order to determine the species without doubt, eggs must be found. *G. Lapage*

Germer, W. D., Schulze, W. & Yong, M. H. Die Epidemiologie der Clonorchiasis, dargestellt an den Verhältnissen in Korea. [**Epidemiology of Clonorchiasis based on Findings in Korea**] *Arch. f. Hyg. u. Bakt.* 1955, Apr., v. 139, No. 2, 97–108, 2 maps & 9 figs. [17 refs.]

The epidemiology of clonorchiasis in South Korea is discussed in a review of 132 cases collected between 1920 and 1954. The intermediate host snail was probably *Bulimus striatulus*. *Bithynia fuchsiana* was rare and *B. longicornis* (the intermediate host in China) was not reported. The freshwater fish concerned were mostly of the carp family. Patients were infected mainly through eating raw, partly cooked or salted fish. A small proportion (11 of 132 patients) were believed to have been infected through drinking water. Men were much more commonly infected than women and adults more than children.

Cases could be classified in three grades: symptomless carriers, uncomplicated clonorchiasis without liver damage, and cases with portal or biliary cirrhosis. The outcome in a given case depended on the number of worms

in the liver, the duration of infection and on the type and severity of existing liver damage, especially that arising from alcohol or malnutrition.

Treatment was unsatisfactory. Regimens of gentian violet plus Resochin, Fuadin plus Resochin, and emetine plus sulphadiazine were tried. Only 8 of 53 cases became egg-free.

Prophylaxis depends largely on education of the public and control of snails which act as intermediate hosts.

[The contents of this paper were largely covered in a previous communication by the same authors (this *Bulletin*, 1955, v. 52, 801).]

B. G. Maegraith

Germer, W. D. Differentialdiagnose und Pathogenese der extrapulmonalen Paragonimiasis. [**Differential Diagnosis and Pathogenesis of Extrapulmonary Paragonimiasis**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1955, June, v. 6, No. 2, 206–12, 3 figs. [13 refs.]

Korea is the home of paragonimiasis and it is variously estimated that from 5 to 25 per cent. of the population is infected. On the whole it is a benign and chronic disease which, though usually well tolerated, is sometimes associated with other diseases such as tuberculosis and avitaminoses. Acute and rapidly fatal cases have been recorded.

Five cases of extrapulmonary paragonimiasis are here described in which the flukes themselves and their eggs have been deviated to the meninges, the brain, pleura, testis or subcutaneous tissues. The differential diagnosis presents considerable difficulties. Combined treatment with emetine and sulphonamide drugs proved unsatisfactory. These 5 cases were investigated in the German Red Cross Hospital in Korea where the radiographic appearances of the lungs in some cases showed minute drop-like opacities associated with small cystic transparent areas.

Hyperinfection with *Paragonimus* was studied in a 23-year-old refugee who had numerous ova in the sputum. At operation 3 adult flukes were evacuated from a cyst the size of a cherry in the temporal lobe of the brain. Microscopic sections of the testis in another case demonstrated the massing of *Paragonimus* eggs.

Of the cases with extrapulmonary complications the most difficult to diagnose were those with meningitis, high fever, coma and local pareses.

It is suggested that unusual location of the fluke and its eggs is to be ascribed to " false " lodgement of the larval stages during the initial invasion, or to the metastatic development when ova or metacercariae break out from the pulmonary tissues and are transported by the blood stream to other parts.

It is thought that the lung fluke can remain viable in the human body for 20 years or longer.

Philip Manson-Bahr

Sotomayor Díaz, R., Alvarez Martínez, M. & Zipper Agragán, J. Contribución al estudio de la hidatidosis en Chile. Aspectos epidemiológicos y acción educativa en las comunas de Lanco y Panguipulli (Provincia de Valdivia). [**Study of Hydatid Disease in Chile. Epidemiology and Educational Measures in the Communes of Lanco and Panguipulli, Valdivia Province**] *Rev. Chilena Hig. y Med. Preventiva.* 1953, July–Dec., v. 15, Nos. 3/4, 91–102. [13 refs.]

Readers of this *Bulletin* will be familiar with the extensive studies of hydatid disease in Chile pursued by Professor Neghme and his colleagues [see for example this *Bulletin*, 1952, v. 49, 705; 1955, v. 52, 557].

The present authors refer largely to this work and discuss the incidence of the disease in man and animals, the unsatisfactory sanitary conditions predisposing to it and its socio-economic implications. Several tables of figures are presented.

The main purpose of their paper is, however, to record in particular a special study undertaken in 2 communes of the Valdivia Province, which accounted in 1952 for 50 of the 506 cases diagnosed in the country. The study included investigation of morbidity, infection in dogs and its eradication, survey of hygienic conditions among the people and in slaughterhouses, and educational measures.

The work began in 1953 and the measures adopted are discussed at length. Stress is laid on the need to control stray dogs and, above all, to use all modern educational methods to instruct the people, including schoolchildren in the importance of the problem. For details of the scheme and its degree of success, the original paper should be consulted.

H. J. O'D. Burke-Gaffney

Vogel, H. Über den Entwicklungszyklus und die Artzugehörigkeit des europäischen Alveolarechinococcus. [**Life History and Specific Designation of European Alveolar** *Echinococcus*] *Deut. med. Woch.* 1955, June 17, v. 80, No. 24, 931–2.

The question whether the larval phases of the tapeworm *Echinococcus granulosus* (hydatid cysts) and human alveolar (multilocular) *Echinococcus* are different larval forms of the same species of tapeworm (*i.e.*, *E. granulosus*) has been for some time the subject of controversy. Hydatid cysts are almost cosmopolitan. Alveolar *Echinococcus*, on the other hand, has a restricted geographical distribution; it is found chiefly in certain areas of southern Germany, in the Alps, the Jura and in Russia and Siberia as far as the Behring Sea. All that is known of its life history is that, if it is given as food to the dog, the tapeworm phase can be obtained; but, because of the rarity of the scolices in the larval phase in man, this has been done only 4 or 5 times between the years 1882 and 1901 and the specific characters of the tapeworm thus obtained have not been determined. Those who believe that alveolar *Echinococcus* and hydatid cysts are different larval forms of a single species of tapeworm think that cattle are the intermediate hosts of both and they state that intermediate larval forms have been found in man. Posselt [no ref.], however, fed human alveolar *Echinococcus* to a dog and obtained from it a tapeworm the hooks and uterus of which differed from those of *E. granulosus*. He and others thought that hydatid cysts and alveolar *Echinococcus* are the larval phases of two distinct species of tapeworm; that the natural intermediate hosts of the alveolar form are cattle; and that the frequency of alveolar *Echinococcus* in certain areas is due to the rearing of certain breeds of cattle in these areas; cattle were suspected because there occurs in them, in addition to hydatid cysts, an *Echinococcus*, called *E. multilocularis veterinorum*, which resembles human alveolar *Echinococcus* but forms rather larger vesicles and has a benign clinical course and a geographical distribution less restricted than that of human alveolar *Echinococcus*; this can hardly be the unknown link in the life history of human alveolar *Echinococcus*, because it usually forms no scolices.

Vogel now records experimental work which shows that human alveolar *Echinococcus* and hydatid cysts are the larval forms of two distinct species of tapeworm, human alveolar *Echinococcus* being the larval form of a

tapeworm, which Vogel now calls *E. multilocularis*, the final hosts of which are foxes, dogs and house cats, the natural intermediate hosts being field mice and perhaps other rodents and, occasionally, man.

The author was led to his own researches by the work of Rausch and Schiller 1951–1954 [no ref.] on the structure and development of a new species called by them *Echinococcus sibiricensis* found on some islands in the Behring Sea, the final hosts of which were the Arctic fox and sledge dogs. The alveolar larval phase occurred naturally in the livers of burrowing mice (*Microtus oeconomus innuitus* and *Clethrionomys rutilus albiventer*). Because human cases of alveolar *Echinococcus* were known in these islands, Rausch and Schiller thought it probable that the species they found there is identical with the European species in man.

The present author investigated wild animals in the Swabian Alps near villages in which human cases of alveolar echinococcosis have recently been found. Terminal egg-bearing segments of tapeworms found in 4 out of 11 red foxes (*Vulpes vulpes*) were given as food to 19 species of mammals. Most of the results are not yet complete, but, among the animals so far dissected, echinococci were not found in 1 sheep, 2 guineapigs and 2 golden hamsters 3 months after infection. But the livers of 2 Nordic burrowing mice (*Microtus oeconomus ratticeps*) and of 3 field mice (*Microtus arvalis*), 1 cotton rat (*Sigmodon hispidus*) and 3 out of 4 white laboratory rats, dissected 1 to 5 months after infection, showed some or many *Echinococcus* with small bladders. In the field mice examined about 4 months after infection and in the Nordic burrowing mice examined 5 months after infection numerous scolices had been formed on the germinal layer lining the bladders. Histological examination showed that the parasites corresponded in structure and in their action on the host's tissues with human alveolar *Echinococcus*. The infection also appeared to be in progress in 2 monkeys, because in these a complement-fixation reaction previously negative became positive in both monkeys and one of them infected 8½ months previously showed signs of disease.

Seeking naturally-infected hosts, the author examined 534 Muridae from the Alps, belonging to 7 species and also 44 shrews. In 4 field mice taken from two regions in which infected foxes occurred, echinococci were found in the livers. In one area 3 out of 44 field mice were infected, but these had only 1 or 2 small young echinococci. In another area the author found 1 out of 216 field mice infected. The greatly enlarged liver of this mouse was infiltrated with *Echinococcus* bladders, on the walls of which were scolices. This liver was given to a dog and 55 days later the author obtained from the dog's small intestine about 1,000 *Echinococcus* tapeworms.

Studies of the tapeworms obtained from this dog and of those obtained from the foxes in the Alps, showed that they belonged to a species different from *Echinococcus granulosus*. The chief differences were;

(1) the position of the genital pore in front of the middle of the proglottid; in *E. granulosus* it is in the middle or behind this;

(2) the number of testes was 21–29; in *E. granulosus* it is 45–65 [other authorities give 35–53 and 40–60];

(3) the testes lie between the posterior end of the proglottid and the region of the cirrus sac; in *E. granulosus* they lie both in front of and behind the level of the cirrus sac;

(4) the uterus has no lateral branches; in *E. granulosus* it often has unbranched lateral branches;

(5) the length of the mature, relaxed worm was 1·4 to 3·4 mm., while *E. granulosus* is longer [5–8 mm.].

A complete description of these worms will be given elsewhere.

It is very probable that the echinococci from the fox and field mice belong to the same species as human alveolar *Echinococcus*, because the alveolar structure of the larval phase corresponds and human and animal infections occur in the same village boundaries. But complete proof of their identity can be obtained only by comparison of tapeworms obtained from larval phases in animals and man and this the author has been able to do. In the Innsbruck Pathological Institute he found *Echinococcus* tapeworms attached to the small intestine of a dog which Posselt had fed, in 1901, with human *Echinococcus alveolaris* from the Tyrol. In the bottom of this museum jar were numerous detached worms in good preservation and examination of these showed that they corresponded with the tapeworms obtained by the author from the wild animals he examined. There is thus no doubt that the two species are the same.

The author names this species *Echinococcus multilocularis*, this name, given by Leuckart in 1863 to human alveolar *Echinococcus*, being the oldest and having priority. If work not yet complete should show that this European species is identical with *E. sibiricensis* described by Rausch and Schiller, which Vogel thinks is possible, *E. sibiricensis* will become a synonym of *E. multilocularis*.

E. multilocularis differs from *E. granulosus* in that herbivora seem to play no part in its life history. Field mice seem to take up its eggs from foxes and the larval stage develops in the livers of these mice; foxes eat the mice. Probably other rodents can also act as intermediate hosts. Sporadic infections of man can occur by men taking up eggs distributed by fox dung, or when men skin foxes. In Alpine villages surrounded by woods the foxes seek mice not only in the fields or meadows, but also often in vegetable or fruit plantations, so that the tapeworm eggs can occasionally be ingested from dirty human hands during work in the fields and woods or with windfall fruit or vegetables. In this way wood-strawberries, bilberries and whortleberries are possible sources of infection. In addition man can be infected from dogs and house cats which have eaten field mice.

G. Lapage

Baer, J. G. Un nouveau cas de parasitisme d'un enfant en Afrique orientale par le cestode *Inermicapsifer arvicanthidis* (Kofend, 1917) [Miscellanea]. [**A New Case of** *Inermicapsifer arvicanthidis* **Infection in a Child in East Africa**] *Acta Tropica*. Basle, 1955, v. 12, No. 2, 174–6, 3 figs.

While *Inermicapsifer arvicanthidis* is often found in rodents in Africa, only 2 cases have hitherto been discovered in man there, namely those of Baylis [this *Bulletin*, 1949, v. 46, 952] in Kenya and Fain [*ibid.*, 1951, v. 48, 174] in Ruanda Urundi.

The third case now reported occurred in a child of 3½ seen in Arusha, Tanganyika. Small bodies 2–3 mm. in length were seen in the stools and were identified as 12 gravid segments of *Inermicapsifer*. The appearances are described and shown in 2 photomicrographs.

The author suggests that this tapeworm may be commoner in man in Africa than has been supposed, but that the small size of the segments has caused them to be overlooked. He believes that it might well be worth while making a systematic search for this tapeworm in children in Africa south of the Sahara.

In comment, the author states that the 3 cases recorded in Africa up to now have on each occasion been in white children [but Fain, in his paper—

and indeed, in its title—clearly states that his case was "*chez un enfant indigène*", which presumably meant an African child].

H. J. O'D. Burke-Gaffney

Dana, R., Dupoux, R., Borsoni, G. & Thonier, J. L'ankylostomiase en Tunisie. Son traitement par le Tétrachloréthylène. Action du T.C.E. sur quelques autres parasites intestinaux. [**Ankylostomiasis in Tunis. Treatment by Tetrachlorethylene [TCE]. The action of TCE in Certain Other Parasites**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 5, 730–48.

Ankylostomiasis was reported in Tunis for the first time in 1894; since then there have been frequent references to the disease in the literature, from several parts of the country; the most frequent references are to the infection in the region of Cape Bon, where many of the cases come from the mines, but the heaviest incidences are in the south. However, most of the authors' cases are from the north and centre of Tunisia.

Market gardens, other than the mines, appear to be the main sources of infection.

Anaemia, often so severe that it necessitates transfusion, is the most constant symptom; other important symptoms are epigastric pain and other gastro-intestinal symptoms, and fever. These often lead to errors in diagnosis. In some cases there are no symptoms.

Treatment with tetrachlorethylene was given to 37 patients, of whom 32 had ankylostomiasis; in 12 cases the infection was combined with that of other parasites. For adults, 6 capsules each containing 1 ml. of tetrachlorethylene were given; when a second dose was required this was given after an interval of 10 days and children below 12 years of age were given smaller doses.

In 23 instances the eggs disappeared from the stools after the first treatment. In 7 cases a second treatment was required and in 1 a third. One patient left hospital before the result of the treatment had been observed.

The effect on *Ascaris* was less satisfactory: in 6 cases they disappeared and in 4 they persisted. The effect on other parasites including amoebae, *Trichuris*, *Giardia* and *Hymenolepis* was not significant. No important toxic symptoms were observed even in exhausted patients or in those suffering from other conditions such as heart disease or pulmonary tuberculosis. However, about 1 in 8 suffered from vertigo, nausea and vomiting.

L. E. Napier

Brumpt, L. C. & Ho Thi Sang. Pathogénie des oedèmes de l'anémie ankylostomique et leur guérison par le traitement vermifuge. [**The Pathogenesis of the Oedemata of Ankylostomiasis Anaemia and their Cure by Anthelmintic Treatment**] *Bull. Soc. Path. Exot.* 1955, v. 48, No. 1, 46–50, 1 chart.

The authors briefly describe the well-known oedemata that accompany anaemia due to ankylostomiasis. Such patients are often considered to be "cardiac", but cardiac treatment has no effect. The oedemata are not renal and there is no albuminuria, cylindruria or functional renal change. In the tropics and among rice-eaters beriberi may be suspected, but the tendon reflexes are normal and the authors, contrary to the report of McKenzie [this *Bulletin*, 1940, v. 37, 219] have not obtained resolution of the oedemata by giving vitamin B1. They have always been struck by the

lack of association between ankylostomiasis and beriberi. Liver function was always normal. Unlike the oedemata of deficiency diseases due to hypoproteinaemia, the oedemata of ankylostomiasis do not yield to protein treatment.

The authors quote the literature on the modifications of the blood proteins in ankylostomiasis. They themselves have always found a reduction of blood proteins in severe ankylostomiasis. They think that, in a severe case of ankylostomiasis with anaemia and oedema, the serum albumin is reduced and that the oedema seems to be directly related to the hypoproteinaemia; therapeutic results support this view.

Anaemic oedemata resist protein treatment and also mercurial diuretics, but they yield in a few days to successful anthelmintic treatment at the time when polyuria occurs. This was established by Thiroux [*ibid.*, 1921, v. 17, 238]. He reported the disappearance of voluminous oedemata 24 to 48 hours after strong doses of thymol (6 to 8 gm.) had completely removed an infection with *Necator*. The present authors have obtained the same result in northern Vietnam with 3 to 8 cc. of tetrachlorethylene and they give brief details about 3 patients treated.

The authors therefore find in the disappearance of anaemic oedemata after anthelmintic treatment a supplementary argument in favour of the part played by chronic haemorrhage in the aetiology of the anaemia of ankylostomiasis. The blood-loss affects both the erythrocytes and the plasma. In their patients the blood pressure and capillary resistance were normal and the only change was in the Starling pressure, *i.e.*, the osmotic pressure of the plasma proteins. The oedemata of deficiency diseases with hypoproteinaemia and those of lipoid nephritis can be treated by suitable diets. In the anaemia of ankylostomiasis anthelmintic expulsion of the worms acts as if one put forceps on bleeding blood vessels.

From the practical point of view the oedemata of ankylostomiasis anaemia, the treatment of which produces such spectacular results, must be distinguished from other oedematous syndromes which have equally specific treatments, *e.g.*, acute hydraemic cachexia due to *Plasmodium falciparum*, subacute "quartan" nephritis, oedemata of the deficiency disease type (Annam swellings) and those of beriberi.

In the discussion that followed, Montel said that he had often seen in Indo-China the spectacular disappearance of oedemata of ankylostomiasis after anthelmintic treatment. *G. Lapage*

Kirchmair, H. Klinik und Therapie der Ankylostomiasis. [**Clinical Features and Treatment of Ankylostomiasis**] *Med. Klin.* 1955, Aug. 12, v. 50, No. 32, 1333–6.

This paper consists of a text-book account of ankylostomiasis. The chief interest is the treatment of 17 cases with Vermella. This is claimed to be relatively non-toxic and has a reputation in Germany as a vermicide. It is a halogenated oxy-derivative of 1-methyl-4-isopropyl benzol and appears to be particularly suitable for the treatment of ankylostomiasis. It is prescribed in capsules of 0·27 gm. each. The treatment is for two days. From the age of 4–10, 6 capsules are given on the first day and two on the second day; from 11–15, 9 capsules on the first and 3 on the second; from 16 onwards, it is 13 capsules on the first and 4 on the second.

It is stated that the ova disappear immediately from the stools. Should a first course not suffice, a second, after a week's interval, may prove more successful. In the present series, no side-effects were seen.

Philip Manson-Bahr

Camain, R., Deschiens, R. & Sénécal, J. Documents histo-pathologiques sur un cas de strongyloïdose intestinale humaine. [**Histopathological Observations of a Human Case of Intestinal Strongyloidosis**] *Bull. Soc. Path. Exot.* 1955, v. 48, No. 1, 51–7, 5 figs. on 3 pls.

A cachexic and dehydrated child of 2 years was admitted to hospital at Dakar with diarrhoea and vomiting which had developed during the previous week. No parasites were found in the blood. The red cell count was 3·6 million cells per cmm. The differential count showed a normal pattern except for 9 per cent. eosinophils. Death occurred the day after admission in spite of parenteral fluid therapy.

Examination of the stool was not made. The aetiology of the condition was determined by histological investigation.

Changes were observed in the mucosa of the duodenum. The tissue was infiltrated with cells, chiefly plasmocytes and eosinophils. Up to a third of the glands of Lieberkühn were invaded by parasitic elements of *Strongyloides*, females, embryos and eggs.

Female adults were found in the glands, the greater part of the body being in the lumen. Rhabditiform larvae and eggs were found sometimes in the glandular lumen, sometimes in the epithelium. The eggs with or without larvae were sometimes found lodged in 2 or 3 neighbouring epithelial cells lysing the cytoplasm and displacing the nucleus. Cyst-like spaces were sometimes produced in this way. Parasites were not found in the submucosal connective tissue or in other layers of the mucosa. The worms could readily be identified as *Strongyloides*. Acute inflammatory cellular response and erosion of the base of the affected gland were common but did not extend to the submucosa or to Brunner's glands. *B. G. Maegraith*

Camargo, H. W. & Lima, E. C. Ascaridiose do ouvido médio. (Observação a respeito de um caso). [*Ascaris* **Infection of the Middle Ear. Account of a Case**] *Folia Clin. et Biol.* S. Paulo. 1954, Apr., v. 21, No. 4, 201–4.

Bourrel, P. Traitement de l'ascaridiose et de l'ankylostomose par la Diethyl carbamyl-1-méthyl-4-pipérazine (Notézine). [**Treatment of Ascariasis and Ankylostomiasis with Diethyl Carbamyl-1-Methyl-4-Piperazine (Notézine)**] *Méd. Trop.* Marseilles. 1954, Nov.–Dec., v. 14, No. 6, 749–53. [15 refs.]

The author quotes literature, most of which has been abstracted in this *Bulletin*, on the use of this drug for the treatment of ascariasis and filariasis. He himself used Notézine (diethylcarbamazine, Banocide) in the form of tablets containing 0·1 gm. of the drug for the treatment of 369 patients with intestinal parasites, including pregnant women and children aged 0–10 years. The 369 patients were given doses higher than those given by earlier authors, namely a daily dose, divided into two daily portions, of 12 mgm. per kgm., given for 10 days, lower doses being considered insufficient. Most of the doses were readily taken without a purgative and the drug was well tolerated without aggravation of the patients' illnesses. There was one asthmatic crisis on the second day of treatment in a girl aged 3 and this might possibly have occurred without treatment. Pruritus occurred in some patients who were also infected with *Loa loa*. The drug appeared not to have the action on amoebiasis reported by Crosnier *et al.* [this *Bulletin*, 1954, v. 51, 421] and by Dana *et al.* (*Tunisie Méd.*, 1951, v. 8, 715).

Tables give the results obtained. The author records an efficacy of 87 per cent. for ascariasis, 60 per cent. for ankylostomiasis, 72 per cent. for ascariasis and ankylostomiasis combined and 50 per cent. for trichuriasis. By comparison the percentage efficacies of other anthelmintics were:

Anthelmintic	Ascariasis	Ankylostomiasis	Ascariasis and Ankylostomiasis	Trichuriasis
Thymol	45% (18 cases)	37% (16 cases)	25% (8 cases)	0% (2 cases)
Oil of chenopodium	80% (40 cases)	25% (24 cases)	73% for *Ascaris* 6% for ankylostomiasis (30 cases)	0% (6 cases)
Santonin	50% (22 cases)	—	—	—

Thus Notézine is at least as effective as these other anthelmintics. The author thinks that it is perfectly indicated for the treatment of ascariasis and ankylostomiasis, especially for pregnant women and suckling and other children and for people who are gravely ill. It acts on filarial worms and it can be supposed that it acts also on larvae of ankylostomes and ascarids. It is difficult to suppose that piperazine does this. Notézine thus assures complete removal of the parasites. Neither fasting nor purgation is needed and the supervision and regimen required by thymol and oil of chenopodium are not necessary. The drug is not toxic and the author proposes to treat 1,500 pupils from Lambaréné schools and, if possible, those of bush schools by means of a 6-month distribution of Notézine to the schoolmasters. Examination of the faeces of these schoolchildren has shown that 80 per cent. of them are parasitized and systematic removal of the parasites must have good effects in areas in which parasitism is common. *G. Lapage*

Vianna Martins, A. & Vianna Martins, J. Acción antihelmíntica de la piperacina. [**Anthelmintic Action of Piperazine**] *Semana Méd.* 1955, July 14, v. 107, No. 2, 86–9. [13 refs.]

The authors, from Minas Gerais, Brazil, give a short review on the literature relating to the use of piperazine derivatives as anthelmintics and then discuss 32 patients treated by them with piperazine hydrate in the form of a syrup containing 500 mgm. of active substance per 4 ml. The dosage was about 50 to 75 mgm./kgm. daily, given for 7 days, according to age. The patients were aged 3 to 66 years. Stool examinations were made before and at various periods after treatment. The preparation was very well tolerated. Most of the patients had multiple intestinal parasitic infections.

In 19 cases of ascariasis, 18 became negative after treatment, as did 8 of 9 cases of enterobiasis: where infection was very heavy a second course of treatment was sometimes required. The drug had no effect in 9 cases of *Necator* infection, or in 5 of 8 cases of trichuriasis and 2 of 4 cases of strongyloidiasis. In the last 2 infections the effect of the drug, if any, was open to doubt. In 2 cases of tapeworm infection and 5 of *S. mansoni* it was without effect. The authors also tried this treatment in 19 cases of infection by 4 species of intestinal protozoa, without effect.

They confirm the efficiency, ease of administration and relative safety of

piperazine in enterobiasis and ascariasis, but regard as disadvantages the fairly high cost and the apparent need for prolonged administration.

H. J. O'D. Burke-Gaffney

Vora, D. D. **A Clinical Study on Specificity of the Anthelmintic Action of Oxygen against** *Ascaris lumbricoides*. *Indian J. Med. Sci.* 1955, May, v. 9, No. 5, 217–19.

The author quotes the work of Talyzin [this *Bulletin*, 1955, v. 52, 65], Zaitseva (*Pediatriya*, 1954, v. 3, 69), who obtained expulsion of worms from 60 per cent. of patients after treatment with intragastric oxygen, and Vora [this *Bulletin*, 1955, v. 52, 806] who obtained expulsion of worms from 58 per cent. of patients. Vora, excluding hyperperistalsis caused by gaseous distension of the gut and irritation of the intestinal mucosa by pure oxygen, proposed that oxygen has a specific action or that the worms could not survive in the unfavourable environment created by the oxygen; but most of the oxygen is absorbed in 3 to 4 hours, so that its action seems to be a specific anthelmintic action. If, however, the oxygen acts as an inert gas, air, which contains only 21 per cent. of oxygen by volume, should give identical results. To compare the action of oxygen with that of air the author administered air into the stomachs of 21 patients whose stools contained *Ascaris* eggs. The technique used was similar to that used by the author for administering oxygen. Air from a compressed-air cylinder was let into a Davidson pneumothorax apparatus. All patients, except one who could not tolerate more than 700 cc. of air and was not given more than this, received 1,000 cc. of air at the rate of 100 cc. in 15–40 seconds. No subsequent purgative was given. The patients were observed for the following 4 days for the expulsion of worms, which was considered to be a positive response.

Of the 20 patients only 3 passed worms, and the worms were dead. A week after treatment the stools of 7 of the 18 who did not pass worms were examined for *Ascaris* eggs. If eggs were not then found, the examination was repeated 2 days later and if eggs were found then the treatment was considered to be a failure. If eggs were not found for 3 successive days, it was concluded that the female worms had been killed and that the treatment had been effective. But of these 7 patients only 2 did not show eggs. Another 7 patients who did not respond to air therapy were given 1,000 cc. of intragastric oxygen " on the 4th day of air therapy " and were observed for the next 4 days, but stool examinations were not done. Of these 3 passed worms.

Thus air therapy gave the poor positive response of 3 out of 21 patients. Adding the 2 patients who showed no *Ascaris* eggs a week after air therapy, the positive response was 5 out of 21 (24 per cent.). The positive response obtained with oxygen therapy in 3 patients out of 7 who had given a negative response to air therapy indicates a specific anthelmintic action of oxygen.

G. Lapage

See also p. 1243, Hartley, **Rearing Simuliids in the Laboratory from Eggs to Adults.**

Yamaguchi, T., Toyoda, H. & Matsuo, E. [**Experimental Infestation on Dog with** *Gnathostoma spinigerum* **Larvae obtained from Second Intermediate Host,** *Ophicephalus argus* **Cantor**] *Shikoku Acta Med.* 1955, Mar., v. 6, No. 3, 111–13, 3 figs. [10 refs.] [In Japanese.] English summary.

Aparicio Garrido, J. La piperazina en el tratamiento de la enterobiasis y la ascaridiasis. [**Piperazine in the Treatment of Enterobiasis and Ascariasis**] *Med. Colonial.* Madrid. 1955, Aug. 1, v. 26, No. 2, 109–15. [13 refs.]

The following is a translation of the author's summary:—

The author treated 58 cases of enterobiasis and 10 of ascariasis with hydrate or citrate of piperazine in [daily] doses of 0·8 to 2·4 gm. for enterobiasis and 2 to 3·3 gm. for ascariasis, according to age. Of those infected with *Enterobius* 84 per cent. [49] were cured after a course of treatment lasting one week, followed by a week's rest, and then repeated. Of the remaining 9 cases, 7 were freed of infection after a second course, the other 2 resisted treatment: these belonged to a family environment with a possible source of infection where reinfection could take place from time to time. The 10 cases of ascariasis were cured after 3 consecutive days of treatment. In no cases were any signs of toxicity or intolerance noted. It is concluded that piperazine is at least as efficacious in these 2 diseases as other anthelmintics, with the advantage of being innocuous at the dosage employed. *H. J. O'D. Burke-Gaffney*

Siemens, H. **Community Treatment for Pinworms.** *Canadian J. Pub. Health.* 1955, May, v. 46, No. 5, 203–4.

The Leduc-Strathcona Health Unit in Alberta, Canada, to which the author belongs, examined 740 children (aged 5–17 years) for the presence of *Enterobius* infection in 1954. A table showing the incidence by age and sex reveals that 38 per cent. were positive, with the greatest incidence between 6 and 10 years.

The development of piperazine compounds gives promise of large-scale measures of treatment not considered feasible before, as these preparations are easily taken, effective and relatively non-toxic. Trials were made in treating with piperazine preparations all residents of two fairly isolated school districts containing respectively 154 and 163 residents. Cooperation was assured and treatment was given for 2 weeks, with one week's rest between. A 2·5 per cent. ammoniated mercury ointment for perianal application was supplied and detailed instructions were given as to hygiene. Owing to practical difficulties, swabs were taken only from schoolchildren and the results were used as an index of success for the community as a whole. The usual doses of the piperazine preparations as recommended by the manufacturers were given.

In the first district, piperazine adipate was used. Before treatment, 15 of 36 children showed positive anal swabs. Three weeks after treatment, 5 children in 3 families were still positive. It was found that none of these families had taken the treatment as prescribed: it was repeated, and 5 weeks later 4 of the 5 children were still positive. It then emerged that none of these children could be persuaded to take the tablets: some complained of the taste, 2 of cramps, and several children spat out the tablets. All the swabs from the children who had taken the product were negative.

In the second district, a pleasant-tasting liquid preparation of piperazine citrate was used. Before treatment, 11 of the 25 children were positive and three weeks after treatment only one was positive. He had taken the piperazine regularly, but had possibly been re-exposed to infection. Treatment was repeated and 5 weeks later all the children were negative.

The author recognizes that the interval between treatment and final swabbing was short: periodic checks are to be made.

These two small trials, however, suggest that these preparations are sufficiently safe for large-scale distribution and show promise when used as directed by the manufacturers. *H. J. O'D. Burke-Gaffney*

Sretenović, B., Veličković, Č. & Popović, D. [**An Epidemic of Trichinosis in the Village Milakovac, Region Žiča, Serbia, in 1954**] *Bull. Inst. Hyg.* Belgrade. 1955, v. 4, Nos. 1/2, 33–40, 3 charts. [In Serbian.]

The English summary appended to the paper is as follows:—

"Early in 1954 an epidemic of 16 cases of trichinosis broke out in the village Milakovac, Region Žiča, Serbia. Up to that time no case of trichinosis had been reported in this village nor in the region of Žiča. The disease occurred after the use of dried pork meat which consequently was not cooked nor fried before use.

"In 4 homes 19 persons ate this meat and 16 of them were infested. In specimens of the dried meat which was consumed, Trichinella spiralis were found in large numbers.

"The incubation period lasted from 6 to 20 days. As constant symptoms there were found: temperature, eosinophilia and conjunctivitis. All patients presented these symptoms.

"The temperature lasted from several days to 6 weeks and was most often of remittent type, while in several patients it was of continued or even of intermittent type. Eosinophilia reached up to 70%.

"Besides the symptoms already mentioned there were often noticed: headache, muscular pains, pain in the abdomen, swelling of the face, congestion of sclera, coughing, sweating, exantheme of urticarial type and diarrhoea.

"Eleven patients had an easy clinical course of the disease, while in 5 patients the symptoms were severe. All patients recovered. Only one patient suffered from pleuritis exudativa lat. sin., as a complication of trichinosis."

Masterton, J. P. & Lewis, H. E. **Trichinosis in Greenland.** *Lancet.* 1955, Sept. 17, 591.

The British North Greenland Expedition, from which the authors write, established a base in Dronning Louise Land in August 1952 and remained there for 2 years. Towards the end of the first year, one man developed symptoms suggestive of trichinosis (but this was subsequently shown to be filariasis acquired in the tropics).

However, because of the work of Leiper (*Proc. Zool. Soc.* London, 1938, 108 (Series C), 13) and of Roth [*Bull. Hyg.*, 1949, v. 24, 759], who regard trichinosis as a major problem in the Arctic, the authors looked for the disease in sledge-dogs and carnivora in Dronning Louise Land.

Specimens of skeletal muscle or diaphragm were taken from sledge-dogs which had died and from Arctic foxes (the only local carnivore). Half of each specimen was placed in artificial gastric juice to dissolve out cysts and the other half was examined histologically.

Positive results were found in 7 of 9 dogs and negative results in all of 6 foxes and 7 new-born puppies. In 6 of the 7 cases of infection both methods were positive: in the seventh, only histological examination was positive.

One of the dogs not infected had been born in Dronning Louise Land, and so had little opportunity to eat raw meat. The other 8 had come with a group of 37 from West Greenland, where the animals are customarily fed with raw meat of polar bear, walrus, seal and the carcasses of dogs which have been shot. Dogs so fed run a great risk and this may explain the occasional unexpected breakdowns, and even death, among dog teams on Polar journeys.

The authors note that the high prevalence of trichinosis in the dogs agrees with the findings of Roth [*loc. cit.*]: they also state that "like Roth (1949), we found no infestation in the fox" [but Roth, in the paper quoted, does in fact report the finding of *Trichinella* in 3 of 101 Arctic foxes: see also Roth, this *Bulletin*, 1951, v. 48, 1034].

No evidence of disease was found thereafter in the men: occasional meals of seal or polar bear meat eaten by them were thoroughly cooked and all other food came from Britain. The authors, however, wish to underline the danger of eating under-cooked meat in Greenland.

H. J. O'D. Burke-Gaffney

DEFICIENCY DISEASES

Murthy, H. B. N.; Reddy, S. K.; Swaminathan, M.; Subrahmanyan, V.; Sur, G. **The Metabolism of Nitrogen, Calcium and Phosphorus in Undernourished Children. 1. Adaptation to Low Intake of Calories, Protein, Calcium and Phosphorus** [Murthy, Reddy, Swaminathan & Subrahmanyan]. *Brit. J. Nutrition.* 1955, v. 9, No. 3, 203–9. [25 refs.] **2. The Effect of Supplementary Groundnut-Milk Curds on the Metabolism of Nitrogen, Calcium and Phosphorus** [Sur, Reddy, Swaminathan & Subrahmanyan]. *Ibid.*, 210–15.

Sandstead, H. R., Koehn, C. J. & Sessions, S. M. **Enlargement of the Parotid Gland in Malnutrition.** *Amer. J. Clin. Nutrition.* 1955, May–June, v. 3, No. 3, 198–214, 14 figs. [46 refs.]

The authors review previous accounts of chronic asymptomatic enlargement of the parotid glands. There are about 12 reports of the condition in the literature, in all of which there is an association with undernutrition. However, in many well documented accounts of severe food deprivations there is no mention of parotid enlargement and it is certainly not a constant feature of the clinical picture of chronic undernutrition.

The present paper records an incidence of parotid enlargement in 369 out of 3,199 Asian males (the locality is not stated, but they were probably residents in Formosa), and in 2 out of 512 white patients, 12 out of 505 Negro patients and 7 out of 14 Asian mentally ill patients in a Washington hospital. The clinical criteria of enlargement are not given, but there is an excellent clinical photograph in which the parotid swelling obscures the lobules of the ears from in front. The condition was found to be associated with angular stomatitis and marked underweight.

Histological studies showed no evidence of any inflammatory process. The enlargement in the acute phase appeared to be due to swelling of individual acinar cells and in the chronic phase to a replacement of acinar tissue by fat.

The authors conclude by agreeing with previous workers that the condition is a manifestation of recent or remote malnutrition and that it occurs most frequently in populations subsisting on diets which are chronically inadequate. *R. Passmore*

Stuart, K. L. & Bras, G. **Clinical Observations on Veno-Occlusive Disease of the Liver in Jamaican Adults.** *Brit. Med. J.* 1955, Aug. 6, 348–52, 5 figs. [12 refs.]

This paper extends the clinical account of veno-occlusive disease of the liver already given by the authors [this *Bulletin*, 1954, v. 51, 972, 973; 1955, v. 52, 568] with a detailed clinical and pathological description of 4 cases in adults. In each case the diagnosis was established on histological grounds (two at biopsy and two at autopsy) and the paper includes two good photomicrographs showing the characteristic narrowing and occlusion of the central hepatic vein, following upon marked thickening of the intima.

The clinical features and course of the disease vary markedly. It appears to be usually a chronic liver failure, subject to acute exacerbations, which may be fatal. Case 1 is however particularly interesting. Here a gross enlargement of the liver took place, while the patient was under medical observation for another condition. The patient was very ill with tense ascites. Liver biopsy showed the characteristic histology. However he made a good recovery and left hospital after 10 weeks. Five months later he was well, the liver appeared normal in biopsy sections and function tests were now also normal. This case is an example of an acute manifestation of the disease with subsequent complete recovery.

It is notable that this man just before the onset of the condition had been taking "bush teas" composed from at least 6 species of plants for their supposed therapeutic effect on another malady. Indeed, all the case histories are consistent with the view that the disease may be caused by toxins from such teas acting on a liver which may be impaired by a long period on an inadequate diet. Direct evidence for this hypothesis is, of course, very hard to obtain. *R. Passmore*

El Din, M. K. B. **Management of Food Intolerance in Infantile Wasting.** *J. Egyptian Med. Ass.* 1955, v. 38, No. 2, 93–101. [13 refs.]

Undernutrition and malnutrition are common causes of infantile wasting in Alexandria. In such children the tolerance of many foods is much reduced and even when they are supplied with adequate food, assimilation is impaired. In a study of 41 cases of infantile wasting it was found that recovery was promoted if aureomycin in amounts up to 100 mgm. daily were incorporated in the diet. Repeated blood transfusions gave only a little help. *R. Passmore*

Food and Agriculture Organization of the United Nations: World Health Organization: Josiah Macy Jr. Foundation. **Protein Malnutrition.** Proceedings of a Conference in Jamaica (1953) sponsored jointly by F.A.O., W.H.O. and the Josiah Macy Jr. Foundation, New York [Waterlow, J. C. (Edited by)]. pp. xvi + 277, 21 figs. & 24 pls. 1955. Cambridge: University Press, England.

Twenty-six persons from all the continents of the world participated in this conference. Almost all have international reputations as authorities

on the subject. There was no formal order of the Proceedings. The Editor in the introduction remarks that " for F.A.O. and W.H.O. it went against the grain at first to embark on a conference with no fixed agenda and no clearly defined objective ". Perhaps after all the grain is a good guide; for this is a quite unreadable book. There were four sessions dealing with Biochemical Aspects, Pathology, Clinical Aspects and Epidemiology and Prevention. The reviewer tried conscientiously to read the verbatim report of each, but the interruptions, often quite irrelevant, make the text unbearable. There is little or no balance or continuity of thought. The inexperienced reader would probably be greatly confused. The experienced will find little new. There has been the delay, apparently inevitable in modern publishing, of two years between the conference and the appearance of the book. The participants are for the most part clear and prolific writers and most of the information found in this volume is already set out, usually more lucidly, in the general scientific press. Much of it has already been abstracted in this *Bulletin*. Any value which the present volume might have had as a reference work is destroyed by the chaotic presentation and the lack of an index.

Experience has shown that such conferences are a valuable experience for the participants. There is the opportunity to test out new ideas before a small and critical audience. But such informal discussions when recorded by shorthand typists and dictaphones make poor reading. It is to be hoped that the sponsoring bodies will continue such conferences but spare us from the publication of the verbatim reports. *R. Passmore*

Trowell, H. C. **Calorie and Protein Requirements of Adult Male Africans.** *East African Med. J.* 1955, May, v. 32, No. 5, 153–63. [21 refs.]

This paper reviews existing standards of physiological needs for calories and proteins and shows how in general they are unsatisfactory for application to the African male. Africans for the most part eat less than the recommended allowances. They weigh less than Europeans and Americans and probably also adjust by decreasing work and all forms of physical activity. It is not certain whether they eat less because they work less or whether the productivity of the labourer, both in agriculture and industry, is reduced by reason of insufficient food intake.

The paper is really a plea for physiological studies on Africans in Africa and also a warning against the too ready application of data obtained in other countries. *R. Passmore*

Autret, M. & van Veen, A. G. **Possible Sources of Proteins for Child Feeding in Underdeveloped Countries.** *Amer. J. Clin. Nutrition.* 1955, May–June, v. 3, 234–43.

The authors point out that protein malnutrition is widespread among young children in many parts of the world. The ideal solution would be an adequate supply of milk, but for agricultural reasons this is often quite impossible. This paper deals with other sources of protein. Soya milks, peanut presscake flours, pulses and fermented milk combinations and fish flours are all good possible sources. The problem of making acceptable preparations and educating the people to use them is discussed at length. This paper describes how FAO and other agencies are developing the use of these products in many parts of the world. *R. Passmore*

Schütte, K. H. **Trace-Element Deficiencies in Plants and their Relation to Kwashiorkor.** *South African Med. J.* 1955, June 18, v. 29, No. 25, 595–6. [18 refs.]

There are extensive deficiencies of trace elements in the soil and in the plants in many parts of Africa. The indigenous population feed predominantly on such plants and get little animal food. This may be an important subsidiary factor contributing to the widespread occurrence of kwashiorkor.

[This is only a brief note and provides no evidence to support the thesis. However, there is a useful bibliography, which includes a reference to the author's survey of trace-element deficiencies of plants in Africa.]

R. Passmore

Varkki, C., Venkatachalam, P. S., Srikantia, S. G. & Gopalan, C. **Study of Birth Weights of Infants in relation to the Incidence of Nutritional Oedema Syndrome (Kwashiorkor).** *Indian J. Med. Res.* 1955, Apr., v. 43, No. 2, 291–6, 1 graph.

Birth weights of 500 babies born of poor mothers and of 200 babies born of upper-class mothers (mostly Army officers' wives) were recorded. Mean weight in lb. were:—

	Boys	Girls
Upper Class	7·15	6·56
Poor	6·05	5·96

The incidence of prematurity (birth weight below 5½ lb.) was 38·4 per cent. among the poor and 12·3 per cent. among the upper class. The average birth weight of 34 children who subsequently developed nutritional oedema was 6·0 lb., *i.e.*, not lower than the average for others in the same economic class.

It was concluded that (a) the socio-economic and dietary status of women during pregnancy influence the weight of the infant at birth, and (b) that such effect of maternal status on the infant may not be a direct contributory factor in the development of nutritional oedema in later years.

R. Passmore

Mukherjee, K. L. & Jelliffe, D. B. **Clinical Observations on Kwashiorkor in Calcutta.** *J. Trop. Pediatrics.* London. 1955, June, v. 1, No. 1, 61–6, 4 figs. [15 refs.]

The paper describes 15 cases of kwashiorkor in Calcutta. The children presented all the features of the disease usually found in African Negro children, except that hypochromotrichia was usually slight. All the cases appeared in the months of September, October and November. It is pointed out that they thus follow the monsoon season, when diarrhoeal diseases are at their maximum incidence. Perhaps attacks of diarrhoea with diminished food absorption may be an important aetiological factor. *R. Passmore*

Jelliffe, D. B. **Hypochromotrichia and Malnutrition in Jamaican Infants.** *J. Trop. Pediatrics.* London. 1955, June, v. 1, No. 1, 25–33, 2 figs. [31 refs.]

Hypochromotrichia—a decrease in the normal colour of the hair—is very common among children with kwashiorkor. In one rural village in the

Mocho mountains in Jamaica [this *Bulletin*, 1954, v. 51, 716] the pattern of infant feeding and weaning was known to be bad. No frank case of kwashiorkor was found, but the incidence of hypochromotrichia among the children was as follows: birth to 1 year, 5 per cent.; over 1 year to 3 years, 75 per cent.; over 3 years to 9 years, 62 per cent.; over 9 years to 17 years, 6 per cent. A "hypochromotrichia index", the percentage of affected children aged between 1 and 3 years, is suggested as a possible public health indication of the amount of infantile protein deficiency among Negro children.

Seven samples of markedly hypochromic hair from children suffering from kwashiorkor were analysed by Dr. Bickel of the University of Birmingham for amino-acid content by means of chromatographic methods. The amino-acid content of such specimens did not differ from that of normal hair.

R. Passmore

de Maeyer, E. M., van Gysel, T. & Peene, H. Note sur les étiologies secondaires infectieuses et parasitaires du kwashiorkor. [**A Note on the Rôle of Secondary Infections and Parasites in the Aetiology of Kwashiorkor**] *Ann. Soc. Belge de Méd. Trop.* 1954, Dec. 31, v. 34, No. 6, 875–80. [10 refs.]

There was no significant difference in the load of intestinal parasites in children with kwashiorkor and a control group. Similarly malarial infection was common in both. Kwashiorkor, however, often follows upon an attack of measles. X-ray examinations of the chest have shown that in many children there is a pulmonary lesion, which is probably of tuberculous origin. It is suggested that epidemics of kwashiorkor occur in some areas as a result of a sudden deterioration of the food. In other areas kwashiorkor is endemic and an attack may be precipitated by an infectious illness. *R. Passmore*

Delon, Jeanne & Menguy, Yvonne. Le traitement de la maladie oedémateuse du sevrage par le plasma intra-péritonéal. [**Treatment of Oedema of Weaning by Intraperitoneal Plasma**] *Maroc Méd.* 1955, Jan., v. 34, No. 356, 55–57.

Intraperitoneal plasma is now given by the authors as a routine to these children. Usually 150 ml. of plasma is given in 30 minutes. This dose is repeated twice a week, but the total amount and the number of injections may be varied. Improvement may be rapid and several children lost 2 or 3 kgm. of oedema fluid. The loss of oedema and the increase in the level of the plasma proteins has been more rapid than with other forms of treatment.

R. Passmore

Ramanathan, M. K., Venkatachalam, P. S., Srikantia, S. G. & Gopalan, C. **A Follow-Up Study of Hundred Cases of Nutritional Oedema Syndrome (Kwashiorkor).** *Indian J. Med. Res.* 1955, Apr., v. 43, No. 2, 285–90, 1 graph.

This paper records the findings at a single home visit to 100 patients with kwashiorkor [this *Bulletin*, 1955, v. 52, 568] discharged from hospital at periods from 6 months to 5 years. Twenty of the children could not be traced, 29 were dead and, of the 51 survivors, 26 showed specific signs of malnutrition. There was no evidence of any improvement in either the

food or the sanitary hygiene of the homes. Despite the "dire poverty of the subjects", some 25 per cent. of these children appeared to be healthy and to be growing well. *R. Passmore*

Walker, A. R. P. **Haemoglobin Concentration and Nutritional State in South African Bantu habituated to a very High Iron Intake.** *South African J. Lab. & Clin. Med.* 1955, Mar., v. 1, No. 1, 36–44. [36 refs.]

This paper produces evidence that mean haemoglobin values of Bantu men and women may lie within a normal range despite a multitude of parasites and a very poor diet. The South African Bantu's diet is exceptionally rich in iron, containing up to 200 mgm. daily. This iron is mostly derived adventitiously from the cooking utensils [this *Bulletin*, 1951, v. 48, 63]. This high intake mitigates the adverse effect of a poor diet and of parasites on haemoglobin formation. Among Bantu, therefore, no reliance can be placed on haemoglobin values in the appraisal of nutritional status. *R. Passmore*

Aguirre, F. & Scrimshaw, N. S., with the assistance of J. A. Muñoz & Adela Cabezas. **The Effect of Supplements of Animal and Vegetable Protein, Vitamin B_{12}, and Aureomycin on Hematological Values in Central American School Children.** *Amer. J. Clin. Nutrition.* 1955, May–June, v. 3, No. 3, 225–9. [15 refs.]

The schoolchildren were apparently in good health except that they were heavily infected with parasites, notably *Ascaris lumbricoides*. Mid-day meal supplements were given for periods up to 17 months. The table summarizes some of the results obtained in Guatemalan schools; they do not show any striking improvement.

No. of Children	Supplement	Mean Haemoglobin gm./100 ml. Initially	After 11 months	After 17 months
20	Control	12·8	13·5	13·9
26	Animal protein snack	13·4	13·0	14·3
11	Vegetable protein snack	13·1	13·1	14·1
11	Vegetable protein snack + vitamin B12 20μgm.	13·5	13·2	14·5
9	Vegetable protein snack + Aureomycin 50 mgm.	13·8	13·3	14·7

Similar results were obtained in El Salvador schools. There was also no significant rise in mean red cell counts or haematocrit values. It was concluded that these supplements had no effects on blood values, even when given for many months. *R. Passmore*

Someswara Rao, K., Ramanathan, M. K., Taskar, A. D. & Phansalkar, S. V. **The Failure of Vitamin B_{12} to promote Growth in Undernourished Indian Children.** *Indian J. Med. Res.* 1955, Apr., v. 43, No. 2, 277–83. [19 refs.]

Daily administration of an oral supplement of 20 to 25 microgrammes of vitamin B12 for 14 to 15 weeks to undernourished South Indian children on vegetarian diets produced no demonstrable effect on growth. Nitrogen retention was also unaffected.

[These experiments appear to have been carried out with scrupulous care and adequate statistical control. The dietary conditions were characteristic of poor Asiatic children. This result makes it extremely unlikely that vitamin B12 will be shown to an effective growth supplement for children.]
R. Passmore

Eales, L., Bronte-Stewart, B. & Brock, J. F. **Nutritional Oedema in the Non-European in Cape Town.** *South African J. Lab. & Clin. Med.* 1955, Mar., v. 1, No. 1, 1–21, 9 figs. [23 refs.]

The problem of the nature of the oedema which may occur in adults who have been undernourished or malnourished for long irregular periods of time is very difficult. This paper illustrates these difficulties by giving a detailed clinical and laboratory report of 4 adult male Bantus admitted to hospital with oedema.

The patients were always put to bed and, unless seriously ill, given no more than a typical Bantu diet and no specific therapy. On bed rest alone, two patients rapidly lost their oedema and made an apparently complete recovery. It was concluded that these were suffering from simple hunger oedema. Without a period of bed rest alone, false conclusions on the effect of specific therapy can easily be reached. The third patient responded to bed rest, but the loss of the oedema was hastened when thiamine was given on the 12th day and promoted a marked diuresis. There was a generalized cardiac enlargement and an abnormal electrocardiogram with inverted T wave. In this patient it would appear that the oedema was due in part at least to thiamine deficiency and a diagnosis of beriberi might be acceptable. In the fourth case there was congestive cardiac failure, which proved intractable and fatal. There was a long history of a poor diet and alcoholism. At autopsy the heart was grossly enlarged. The valves appeared normal as also did the coronary arteries. Histologically the myocardium showed intracellular and extracellular oedema and increased vascularity. The case appeared to fit the description of " nutritional heart disease ", as reported by Gillanders [this *Bulletin*, 1953, v. 50, 141].

In 3 of the 4 patients there was depression of endogenous creatinine clearance. This and a slight proteinuria suggest the possibility that there may be " a nutritional renal failure ". Finally it is postulated " that malnutrition which may affect the integrity of function and structure in every system of the body may produce oedema by most mechanisms known to produce oedema among well-nourished people ". *R. Passmore*

Limbos, P., Burette, E. & Rogowsky, M. Sur une forme particulière de béri-béri observée à Stanleyville. [**On a Special Form of Beriberi observed at Stanleyville**] *Ann. Soc. Belge de Méd. Trop.* 1954. Dec. 31, v. 34, No. 6, 963–79. [13 refs.]

The presence of beriberi in the Belgian Congo has long been recognized, though the disease is not so extensive as in the Far East. The authors followed 70 cases in the period 1950–1953.

All the patients were adults: only two were female. Most were soldiers, artisans or clerks, Africans with incomes above the average. All had an abundance of food, either manioc, rice or bread. There was never any shortage of calories in the diet, but intakes of thiamine were often unsatisfactory. Alimentary infections, especially bacillary dysentery, seemed to play an important rôle in aetiology. The use of sulphonamides and antibiotics may have been a contributory factor in some patients.

Clinically the cases presented the classical features in a mild form. Pretibial oedema was common. Neurological features were only minor. Clinical signs of disturbance of the cardio-vascular system were usually slight. However, in many cases radiological examination showed dilatation of the right heart, sometimes very marked. Electrocardiographic changes were also common. Prolongation of the QRS complex, indicating a right bundle branch block, was found in 22 cases. The radiological and electrocardiographic changes are discussed in detail. Most of the patients responded rapidly to orthodox therapy. *R. Passmore*

SPRUE

Thiele, O. W. Lipoidbilanzuntersuchungen bei einem Fall von einheimischer Sprue. [**Lipoid Balance in a Case of Endemic Sprue**] *Klin. Woch.* 1955, May 1, v. 33, Nos. 17/18, 421–6. [Numerous refs.]

Lipoid balance was studied in a " typical " case of endemic sprue and in a healthy person. Total lipoids passed in the stool of the patient amounted to 27·5 per cent. of the intake; over 80 per cent. was in the form of fatty acids. Soaps and iodine numbers were the same in stool and dietary fats. Phosphatide excretion was within normal limits. Excretion of plasmal (not free) was 6 times greater than in the normal control. Changes in serum lipoids 4 hours after ingestion of 50 cc. olive oil were within normal limits.

[No clinical details of the case are given.] *B. G. Maegraith*

French, J. M. **The Aetiology and Mechanism of Steatorrhoea.** *Postgraduate Med. J.* 1955, June, v. 31, No. 356, 299–309, 4 figs. [73 refs.]

HAEMATOLOGY

See also p. 1223, Walker, **Haemoglobin Concentration and Nutritional State in South African Bantu habituated to a very High Iron Intake.**

Schneider, Rose G. & Haggard, Mary E. **Sickling, a Quantitatively Delayed Genetic Character.** *Proc. Soc. Exper. Biol. & Med.* 1955, June, v. 89, No. 2, 196–9, 3 figs. [13 refs.]

It is well known that sickle-cell anaemia is very rare in infants and that the percentage of sickling cells in individual babies increases with age until at 4½ months it reaches the usual incidence of 90 per cent. [this *Bulletin*, 1948, v. 45, 926]. It has always been assumed that this fact is correlated with the presence of foetal haemoglobin in the cells of new-born infants. Foetal haemoglobin increases the solubility of sickle-cell haemoglobin and would therefore prevent sickling. In the present investigation cord blood from Negro babies was examined for sickling and the haemoglobin was

analysed for the S and F types. In 7 new-born Negro babies in whom sickling was discovered by the metabisulphite test no more than 3 to 15 per cent. of the cells did actually sickle at birth. No appreciable quantity of S haemoglobin could be detected by paper electrophoresis at this stage. In free boundary electrophoresis of 4 samples the S haemoglobin content ranged from "not demonstrable" to 21 per cent. In contrast blood samples from 4 of the same babies at 4½ to 7 months showed almost 100 per cent. sickling when tested with metabisulphite and the S haemoglobin values were about 40 to 50 per cent. as in adults with sickle-cell trait. Thus the rarity of sickle-cell anaemia and the paucity of sickling erythrocytes in young infants are explained by a quantitative delay in the production of S haemoglobin which like normal adult haemoglobin does not reach adult levels until the age of about 4½ months. *H. Lehmann*

Griffiths, F. E. D. & Grimshaw, W. **Brewer's Medium as a Method of Inducing Sickling in Susceptible Cells.** *J. Clin. Path.* 1955, Aug., v. 8, No. 3, 267.

The authors detected sickling in the erythrocytes in wet blood smears from a woman of pure Negro stock who had been suffering from anaemia, cholaemia and uraemia. Among the investigations made (during a haemolytic crisis) was blood culture in glucose broth and in Brewer's medium: Brewer's medium is nutrient broth containing 0·1 per cent. sodium thioglycollate (thiolacetate) and 0·05 per cent. agar.

No change occurred in the appearance of the blood in the glucose broth, other than slight crenation of the erythrocytes: but samples taken from the Brewer's medium showed sickling of the red cells, which persisted. The tube of medium had been sealed with cotton wool, but no oil had been placed on the surface of the medium.

Repeated experiments, and staining of the blood smear obtained, showed the presence of cells typical of sickle-cell disease and resembling those found by the usual methods of examination. All these methods require the use of formalin for fixing the sickled cells and this results at times in unsatisfactory staining.

With the use of Brewer's medium, the necessity to employ formalin is obviated: furthermore, the medium provides a source of material from which smears can be stained. It would seem that the induction of sickling and the subsequent fixation of the cells is due to the thioglycollate present in the medium. *H. J. O'D. Burke-Gaffney*

Griffiths, F. E. D. **Ethyl Biscoumacetate as an Inhibitor of Sickling.** *Lancet.* 1955, July 2, 20–21. [11 refs.]

A Jamaican negress with a sickle-cell trait (pattern S-A), who had suffered a typical sickle-cell crisis at the birth of her first child, developed a femoral thrombosis after the birth of her second child, though free from haemolytic complications. She was treated with ethyl biscoumacetate.

Repeated previous observations had shown that sickling was complete in 24 hours at 37°F., and at room temperature in 48 hours without an anticoagulant and in 72 hours with heparin. After the treatment with ethyl biscoumacetate a vaseline slide preparation of heparinized blood showed no sickling in the first 20 days; from the 21st to the 25th day a few cells sickled but no field showed more than 4 per cent. sickled cells. Five weeks later, no treatment having been given in the meanwhile, a heparinized blood

preparation showed 90 per cent. sickling in 72 hours; the addition *in vitro* of ethyl biscoumacetate, 10 mgm. per 100 ml. in sterile isotonic solution, resulted in less than 1 per cent. sickling in 26 days.

"Although sickle anaemia is basically a defect of haemoglobin, the clinical effects are those of thrombo-embolism. It would appear, therefore, that anticoagulants should have some part to play in the treatment of these effects", and that a trial would be justified in "cases showing frequent sickle crises, to determine whether frequency is diminished or modified by long-acting drugs" and during crises, "to evaluate the action of short-acting drugs in minimising the thrombo-embolic effects of such attacks".

L. E. Napier

Huisman, T. H. J., van der Schaaf, P. C. & van der Sar, A. Enkele onderzoekingen betreffende het abnormale haemoglobine C. [**Two Families with Abnormal Haemoglobin C**] *Nederl. Tijdschr. v. Geneesk.* 1955, July 30, v. 99 (iii), No. 31, 2284–94, 5 figs. [21 refs.] English summary.

This paper is the result of a collaboration between the University Children's Hospital in Groningen, Holland, and the Public Health Service in Curaçao, in the Dutch Antilles. Two families in which haemoglobin C occurred were discovered. One was apparently white, the other one Negro, both from the same island. Of the first one parent and 3 offspring were seen; the parents and one of the children were heterozygous for normal and C haemoglobin, the other two children were homozygous for haemoglobin C. In the second family both parents were heterozygous for haemoglobin C and normal adult haemoglobin, one child was a heterozygote and one a homozygote for the haemoglobin C gene. Besides the differences in electrophoretic mobility this paper records that carbon monoxide haemoglobin C is less soluble than normal carbon monoxide haemoglobin; haemoglobin C also contains more lysine than normal haemoglobin. All the patients with haemoglobin C disease were free from alakali-resistant (foetal) haemoglobin.

H. Lehmann

Bird, G. W. G., Lehmann, H. & Mourant, A. E. **A Third Example of Haemoglobin D.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1955, July, v. 49, No. 4, 399–400.

Haemoglobin D was found in a Sikh soldier in India. This finding supports the view that it is of European, not Negro, origin.

Lie-Injo Luan Eng. **Haemoglobin E in Indonesia.** [Correspondence.] *Nature.* 1955, Sept. 3, v. 176, 469–70.

Haemoglobin E which until recently was thought to be rare has been found to have a high incidence among the Thais. This note reports the finding of haemoglobin E in Indonesia. Five hundred samples of blood were taken at random from patients at the Central General Hospital at Djakarta. Most of the patients were from West Java and the rest were from different parts of Indonesia; 479 were Indonesians, 13 of mixed Chinese and Indonesia blood and 8 were Indo-Europeans. Haemoglobin E was found in 18 persons: 16 were Indonesians, one was of mixed Chinese and Indonesian blood and one an Indo-European. They were AE heterozygotes. No other abnormal haemoglobins were found in this survey. In a previous publication [this *Bulletin*, 1955, v. 52, 681] the author had described the

occurrence of thalassaemia in Indonesia. It now appears that one of the patients described was in fact suffering from thalassaemia-haemoglobin-E disease. Two further such cases have since been discovered. In those carrying the trait, haemoglobin E formed the minor component, whereas in thalassaemia-haemoglobin-E disease the majority of the haemoglobin was present as the E variant. *H. Lehmann*

EPIDEMIC DROPSY

Chaudhuri, R. N., Chakravarty, N. K. & Saha, T. K. **Experimental Studies on Epidemic Dropsy.** *Indian J. Med. Sci.* 1955, Apr., v. 9, No. 4, 153–5, 6 figs. (5 on pl.). [10 refs.]

The authors studied the properties of alkaloids extracted directly from seeds of *Argemone mexicana*. Intraperitoneal and subcutaneous injection of aqueous solution into white rats 5 to 6 days a week for 2 to 3 weeks produced ascites and other symptoms. Intracutaneous injection into the abdominal skin of rabbits injected with trypan blue resulted in increased local capillary permeability. Sandison-Clark chambers were prepared in the ears of rabbits. The development of vascular proliferation was compared in normal animals and in animals injected with alkaloids in increasing doses of 2 to 15 mgm./kgm. over a period of 6 to 14 weeks. Intense vascularization due to the formation of an inter-communicating network of new vessels was observed in the animals treated with alkaloids. The vessels were extremely unstable and the area was periodically observed to blanch. The authors suggest that periods of anoxia might arise from this vasomotor liability and might be a factor in the stimulation of new vessel formation.
B. G. Maegraith

VENOMS AND ANTIVENENES

Schöttler, W. H. A. Lista suplementar de bibliografia sôbre venenos animais publicada nos anos de 1863 até 1946. [**Supplementary List of the Bibliography of Animal Venoms published between 1863 and 1946**] *Mem. Inst. Butantan.* 1954, v. 26, 7–73.

This list of references, which occupies 64 pages of text, supplements the list published in 1948 by R. W. Harmon and C. B. Pollard, *Bibliography of Animal Venoms*, University of Florida Press, Gainesville, Fla.

Giboin, L. Etude d'ensemble sur l'envenimation ophidienne au Togo pendant les années 1951–1952–1953. [**General Study of Snake Bite in Togoland during the Years 1951–1953**] *Méd. Trop.* Marseilles. 1954, Sept.–Oct., v. 14, No. 5, 542–68, 1 fig. & 2 graphs.

The author reports information obtained by questionaries covering diagnosis and treatment of snake bite, in Togoland, French West Africa, between May 1951 and December 1953.

In that period 189 cases of bite were recorded; 121 snakes were identified. There were 21 deaths. *Echis carinatus* was responsible for 63 cases (42

identified) with 19 deaths. Vipers other than *Echis* (including *Causus* spp., *Bitis* spp. and probably *Atractaspis* spp.) accounted for 34 bites. Colubrids, including *Naja nigricollis* and probably *Dendroaspis* spp., were responsible for 8 cases. *Dendroaspis* was presumed to be the cause of 2 deaths.

Treatment consisted primarily in the use of antisera, either French (West African) or Indian (Bombay) or both. Fifteen deaths were reported in patients bitten by *Echis* and treated with French serum only. Adjuvant treatment included administration of vitamin K (K Thrombyl) in large doses, sometimes protamine sulphate and other haemostatics, and sometimes anti-gas-gangrene sera. Incision, scarification and local injection of potassium permanganate were also commonly practised. In one fatal case suction was tried within 2 hours of the bite. Symptomatic treatment with cardiac tonics was also carried out.

Bites occurred most often in savannah districts (the haunts of *Echis*) and were usually inflicted on the lower limbs of agricultural workers. Bites were reported most commonly early in the two rainy seasons.

An account of *Echis carinatus* is given in view of its being clearly the most dangerous snake in Togoland.

An appendix is given covering recent information. Twelve deaths were recorded in the last year. *Echis* was again the main culprit. The value of serum therapy (French) plus vitamin K was confirmed.

B. G. Maegraith

Theodor, O. **On Poisonous Snakes and Snake Bite in Israel.** 48 pp., 13 figs., 10 pls. & 1 map. [10 refs.] 1955. Jerusalem: Israel Scientific Press.

This hand-book has been produced to supply information regarding the poisonous snakes in the area of Israel. Only one poisonous snake (*Vipera xanthina palaestinae*) is common in inhabited Israel but others are likely to be met as a result of the spread of colonization to the Negev.

The book is divided into sections, including a general description of snakes and their identification; detailed illustrated descriptions of the local species and their distribution within the area concerned; a note on the toxicity of venom; local statistics; descriptions of the human pathology and clinical picture and treatment.

Over 30 species of snakes have been recorded in the area, including 7 poisonous, and 1 poisonous snake from neighbouring territory. Poisonous snakes listed are *Vipera xanthina palaestinae*, *Echis colorata*, *Aspis cerastes*, *Aspis vipera*, *Pseudocerastes fieldii*, *Atractaspis engaddensis*, *Walterinnesia aegyptia* (the black hoodless cobra) and *Naja haje* (the Egyptian cobra, probably a visitor). Several opsthoglyphs and aglyphs are also described.

The author estimates that up to 30 cases of snake bite occur yearly in Israel, most in the summer at night. In all cases in which the snake was identified, *Vipera xanthina palaestinae* was responsible. The death rate in snake bite over the last 24 years has been about 7 per cent.

Local symptoms of biting with the above snake include tenderness and swelling which spreads centrifugally, reaching a maximum in 3 to 4 days. Blisters containing serous fluid or blood are common and may be large. The bite is reddened and tender and red lines run along the local lymph vessels. Local lymph glands are swollen and tender. Swelling recedes in about a week.

Nausea and abdominal pain appear in severe cases within half an hour of the bite. Vomiting is followed by diarrhoea which may be very severe

and lead to considerable dehydration. Peripheral vascular shock with marked haemoconcentration develops and haemorrhages may occur under the skin, into the muscles, intestines, nose and kidneys. As the patient recovers the red cell count falls, often to low figures in spite of blood transfusion.

First-aid procedures recommended include ligature, deep incision and drainage of the area, immobilization by splinting, compresses, injection of antiserum subcutaneously or intramuscularly near the bite. The patient should be sent to hospital at once. Hospital treatment includes intravenous injection of antivenene, blood transfusion and saline and glucose infusion. Other methods including the use of antihistaminics are discussed.

The type of antivenene to be used in the individual case is also discussed. An antivenene against the venoms of *Vipera xanthina palaestinae* and of *Echis colorata* are being prepared at the Pasteur Institute in Paris.

B. G. Maegraith

Deutsch, H. F. & Diniz, C. R. **Some Proteolytic Activities of Snake Venoms.** *J. Biol. Chem.* 1955, Sept., v. 216, No. 1, 17–26, 5 figs. [23 refs.]

"The proteolytic activities of fifteen snake venoms on various substrates have been studied. Ethylenediaminetetraacetate, while strongly inhibiting the digestion of hemoglobin, does not affect the splitting of benzoyl-L-arginine ethyl ester. Ovomucoid and trypsin soy bean inhibitor have no inhibitor action on either reaction. Like trypsin, the venoms digest fibrinogen far more rapidly than fibrin.

"All of the venoms liberate bradykinin from a serum globulin fraction. With the exception of *Agkistrodon piscivorus piscivorus* and *Agkistrodon contortrix* the venoms have the chymotryptic-like effect of destroying this substance. However, no appreciable action on acetyl-L-tyrosine ethyl ester is shown by any of the venoms.

"No definite relations for the various proteolytic activities of a given venom are usually apparent."

Slotta, K. & Borchert, P. Sôbre o fator hemolítico dos venenos ofídicos. [**The Haemolytic Factor in Snake Venoms**] *Mem. Inst. Butantan.* 1954, v. 26, 297–309, 6 figs. on 5 pls. [11 refs.]

The English summary appended to the paper is as follows:—

"A simple apparatus of plastic material was used to localize directly on the filter paper strip of the electrophoresis the haemolytic factors. By this procedure it was determined that lecithinase A (or phospholipase A) of the venoms of *Crotalus terrificus* (= Cascavel) and *Trimeresurus flavoviridis* (= Habu) is found at the correspondent places on the strips. The directly haemolytic fraction ('haemolysin') of the *Naja naja* venom is the most advanced fraction; bee venom contains two directly haemolytic fractions."

Chang, Chuan-chiung & Lee, Chen-yuan. **Cholinesterase and Anticholinesterase Activities in Snake Venoms.** *J. Formosan Med. Ass.* 1955, Mar., v. 54, No. 3, 103–11, 5 figs. [21 refs.]

Acetylcholine, methacholine and benzoylcholine chloride were used as substrates for the assay of esterases in venom from *Bungarus multicinctus*, *Naja naja* (Formosan cobra), *Agkistrodon acutus*, *Trimeresurus mucrosquamatus* and *gramineus*, and *Vipera russellii*.

Cholinesterases were present in the venom of the first two snakes (Elapidae) but not that of the others. The *Bungarus* venom, volume for volume, contained 9 times more than that of the cobra.

Experiments with known inhibitors of esterase showed that the *Bungarus* esterase was a specific cholinesterase. The esterase in the cobra venom was also specific, but was unstable in the venom which contained inactivators. The anticholinesterase activity of the venom was inhibited by magnesium chloride.

There appeared to be no relation between the curare-like effect of *Bungarus* venom and the content of cholinesterase. The latter was inactivated by heat without affecting the former. *B. G. Maegraith*

Slotta, K. & Ballester, A. Determinação colorimétrica da hialuronídase dos venenos ofídicos. [**Colorimetric Determination of Hyaluronidase in Snake Venoms**] *Mem. Inst. Butantan.* 1954, v. 26, 311–18, 4 graphs. [11 refs.]

The English summary appended to the paper is as follows:—

"Hyaluronidase liberates from hyaluronic acid reducing sugars, determined by means of the Prussian blue reaction. Addition of detergents is avoided by working at a pH of 1–1·5. The method gives good results with amounts corresponding to 1–10 micrograms of glucose. The hyaluronidase content of some snake venoms was determined in this way. Crotoxin possesses a hyaluronidase activity approximately 50% higher than dry Crotalus t. terrificus venom."

Ariff, A. W. **Cortigen for Snake-Bite.** [Correspondence.] *Brit. Med. J.* 1955, July 16, 204–5.

Since March 1954 the author has treated 52 cases of snake bite, mostly of the Malayan pit viper *Ancistrodon rhodostoma*, with Cortigen (suprarenal cortex hormone) given orally over 48–72 hours in doses varying from 6·25 mgm. in children under two years to 75 mgm. in adults. Doses were given every four hours for the first 24 hours then every six hours. Patients were also given a potassium citrate mixture and salt-free diet. With this treatment the stage of gross swelling and mucosal bleeding was aborted. The author states that none of the 52 patients died or "exhibited toxic effects", and that no patient suffering from snake bite has died since the introduction of Cortigen treatment, whereas 32 died between 1946 and 1954.

[It is to be hoped that the author will state his case more clearly elsewhere than in a correspondence column. As it stands, it is very difficult to assess the value of the work. No details of diagnosis or of the clinical state of patients are given.] *B. G. Maegraith*

Schöttler, W. H. A. Aspectos metodológicos da titulação de soros antipeçonhentos. [**Titration Methods for Antivenenes**] *Mem. Inst. Butantan.* 1954, v. 26, 249–56. [21 refs.]

The English summary appended to the paper is as follows:—

"The methods now used in the titration of antivenins vary from country to country. In common they only have the fact that they give no indication of the therapeutic value of such serums. It is, therefore, necessary not only to establish standards for antivenins like those adopted for antitoxins but also to avoid the errors inherent in the determination of the toxicity

of venoms and of their neutralization by the specific antivenin as well as to trace the factors responsible for such errors. In order for an antivenin to serve as standard, it must, in a reasonable amount, be able to save the life of a susceptible animal that has been previously inoculated with the maximum amount of venom any specimen of the corresponding species of snake may inject on biting."

Vachon, M. Sur la présence en Tripolitaine d'un scorpion du Sud algéro-tunisien, *Buthiscus bicalcaratus* Birula, et sur la morphologie des appendices de la protonymphe. [**Presence in Tripolitania of a South-Algeria-Tunisian Scorpion** *Buthiscus bicalcaratus* **and the Morphology of the Appendices of the Protonymph**] *Arch. Inst. Pasteur d'Algérie.* 1955, June, v. 33, No. 2, 101–5, 5 figs.

Mohammed, A. H., Bassiouni, S. & Zaky, O. **Effect of Egyptian Scorpion Toxin on Blood Picture of Rats and its Relation with Cortisone.** *J. Trop. Med. & Hyg.* 1955, July, v. 58, No. 7, 158–61, 6 figs.

The effects on erythrocyte and leucocyte counts, differential leucocyte count and circulating eosinophil count of subcutaneous injection into albino rats of (i) a lethal dose and (ii) a sublethal dose of scorpion venom are compared. For each experiment 5 rats received toxin and 5 acted as controls. Blood samples were taken from the tails.

Results are given as "averages" for the animals concerned.

Lethal doses killed in 1½ hours. In this time the erythrocyte and leucocyte counts fell from 8·5 to 5·6 million cells and from 10·2 to 5·2 thousand cells per cmm., respectively. Numbers of neutrophils were reduced and of lymphocytes raised. The number of circulating eosinophils was increased.

Sublethal doses led to some slight increase in erythrocyte count "in 70 per cent", an increase in neutrophils and reduction in lymphocytes notable after 12 hours, and a small decrease in circulating eosinophils.

The authors tested the theory that the "eosinophilia" was due to inhibition of the adrenal cortex by following the lethal dose after 3 minutes by an injection of cortisone acetate. Animals were still alive after 8 hours without obvious change in eosinophils.

[The publication of fuller details of experimental procedures and results would make this work easier to assess.] *B. G. Maegraith*

Balozet, L. Venins de scorpions et sérum antiscorpionique. [**Scorpion Venom and Antiserum**] *Arch. Inst. Pasteur d'Algérie.* 1955, June, v. 33, No. 2, 90–100, 1 fig. [19 refs.]

The author, who writes from the Pasteur Institute of Algiers, gives a short account of some of the scorpions which are most troublesome in French North Africa. He gives a table of enzymes found in the venoms, and compares them with those of certain poisonous snakes.

He describes the preparation of antiserum by inoculation of horses with the relevant venom, pointing out that scorpion venom is a poor antigen, and that immunization is never complete. Certain physiological actions of the venom are never suppressed even when the horses have been continuously injected for several years; for instance, local pain at the point of injection remains violent, and should be reduced by the use of novocaine, and the action of the venom on smooth muscle is not neutralized.

The neutralizing power of the therapeutic serum prepared at the Pasteur Institute of Algeria is such that at least 1 mgm. of venom of *Androctonus australis* is neutralized by 1 cc. of serum. This same serum neutralizes the venoms of other species also, but more feebly. In regard to treatment the author points out that the longer specific treatment is delayed, the more serious is the prognosis. Although 1 cc. of the official serum is capable of neutralizing the amount of venom normally inoculated by a scorpion, it is wise to inject 20 or 30 cc. at least in a case of scorpion sting. This is especially true if there has been a delay of some hours before treatment is given. When the serum is used in these full doses and at a reasonable time after the sting, the mortality is quite low. The author's own series of 1,267 observations showed a mortality of 4·3 per cent. But this percentage is probably higher than the true mortality because doctors in that area tend to report the fatal cases and not to report many of those in which serum has been used successfully. Mortality is particularly high in children under 12 years of age, and in the author's series the mortality for this group was 7·95 per cent., whereas in persons over 12 years of age it was 2·8 per cent. Failures are observed chiefly in those patients who receive the serum many hours after the sting or in whom the symptoms of intoxication are particularly serious, especially if there is indication that the medulla was affected.

Charles Wilcocks

Finlayson, M. H. **Spider-Bite in South Africa.** *South African Med. J.* 1955, May 28, v. 29, No. 22, 509–10. [10 refs.]

Latrodectus indistinctus and *L. geometricus* are both widespread in South Africa and the Rhodesias. Cases of spider bite have been reported from the Western Province, Eastern Orange Free State, Stellenbosch and Constantia. *L. indistinctus* nests in wheat lands and is disturbed during harvesting, when most bites occur. [The same point is made by Maretić and Stanić, this *Bulletin*, 1955, v. 52, 931.] *L. geometricus* bites occurred most commonly in vineyards, also during harvesting. One species of *Harpactirella* (*lightfooti*), the hunting spider, is also believed to have caused arachnidism.

The venom extracted from the cephalothoraces of *L. indistinctus* has been found to be much more potent than that of *L. geometricus*. The former contains an antigen not present in the latter as well as the same antigens, so that antisera prepared from *L. indistinctus* could be used in neutralizing the effects of the bites of either. Antisera prepared from the venom of *L. mactans* is effective in neutralizing the venom of *L. indistinctus*. The two presumably contain a common antigen.

The effect of the venom of *H. lightfooti* are demonstrable in mice and guineapigs after biting, but the venom is too labile for crude extraction. Some protection is obtained by *L. indistinctus* antivenene.

Antiserum against *L. indistinctus* venom is issued in the Union. It appears to be effective but details are lacking. A careful investigation of its value is called for.

B. G. Maegraith

Slotta, K. & Borchert, P. Histamina e toxinas protéicas no veneno de abelha. [**Histamin and Protein Fractions in Bee Venom**] *Mem. Inst. Butantan.* 1954, v. 26, 279–95, 7 figs. [29 refs.]

The English summary appended to the paper is as follows:—

" Snake and insect venoms have—besides many others—actions similar to histamine. Until now it was impossible to know to what extent the

action of bee venom is due to its histamine, since no reliable quantitative determinations had been carried out.

"It was necessary, therefore, to determine, by means of different chemical and biological methods, the content in histamine of crude bee venom, the amount of 0·34 to 0·48% being found. This small amount cannot be responsible for the strong physiological action of this venom.

"Electrophoretic separation of bee venom on filter paper resulted in at least 5 protein fractions. Two of those have strong action on the smooth muscle, similar to histamine, which cannot be inhibited by antihistamine substances. Either one of the active fractions desensitizes the guinea pig ileum against a second dose; one of them also against the other one, but not the other way around. The two fractions also differ in their kymographic curves and in their inhibition times (35 against 60 seconds).

"This delay in the onset of the histamine-like action has already been observed in the case of crude snake venoms and, therefore, the action on the muscle of the two bee venom fractions was compared with the one of *Crotalus* venom and crystallized crotoxin. It seems that the proteins similar in their action to histamine play the decisive part in the poisonous action of these venoms."

Tange, Y. Beitrag zur Kenntnis der Morphologie des Giftapparates bei den japanischen Fischen, nebst Bermerkungen über dessen Giftigkeit. X. Über den Giftapparat bei *Sebastolobus macrochir* (Günther). [**Morphology of the Poison Apparatus of Japanese Fish, with Observations on their Toxicity. X. Poison Apparatus of** *Sebastolobus macrochir*] *Yokohama Med. Bull.* 1955, Feb., v. 6, No. 1, 46–51, 3 figs.

TOXOPLASMOSIS

Fasser, E. **Congenital Toxoplasmosis in South Africa. A Review and Case Report.** *South African Med. J.* 1955, July 16, v. 29, No. 29, 684–8, 3 figs. [29 refs.]

Giovannoni, M., de Mello, M. J. & Nobrega, P. Ensaio de transmissão da toxoplasmose por insetos hematófagos. [**Toxoplasmosis Transmission by Bloodsucking Insects**] *Arquivos Inst. Biológico.* S. Paulo. 1952–54, v. 21, 1–4.

The English summary appended to the paper is as follows:—

"The authors were able to infect *Culex quinquefasciatus* Say by feeding it on pigeons experimentally inoculated with Toxoplasma. The toxoplasma is harbored in the insect at least for 96 hours after the infecting meal as demonstrated by mouse inoculation.

"The infected mosquitoes cannot transmit the infection through their bites. *Pseudolynchia canariensis* (Macquart), captured inside a pigeon house when toxoplasmosis was prevailing, were also unable to transmit the disease to healthy pigeons on which they were allowed to feed.

"The results so far obtained do not support the idea of there being an evolutive phase of the toxoplasma in the mosquito's body."

Vollbrechtshausen, Renate. Tierexperimentelle Untersuchungen zur Frage der aktiven Immunisierung bei Toxoplasmose. [**Animal Studies on the Question of Active Immunity in Toxoplasmosis**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1955, June, v. 6, No. 2, 159–65. [22 refs.]

Experiments were undertaken to determine whether previous infection with toxoplasms conferred immunity from reinfection. Two to twelve months after their primary infection with toxoplasms the dye-test titres in 8 dogs were high and complement-fixation tests were + + or more. In 4 of 6 rabbits there were high dye-test titres, but in one it was only 1 in 16 and in one negative; the complement-fixation tests were negative. The animals were reinfected either intravenously or intramuscularly with toxoplasms in doses varying between 10 and 60 millions. They all became sick but all recovered, with an increase in antibody titres, with the exception of the two rabbits which were deficient in antibody when reinfected. As the reinfecting dose of toxoplasms should certainly have killed all the animals had no defence mechanism been present, it is concluded that previous infection with toxoplasms causes some degree of active immunity.

I. A. B. Cathie

Nobrega, P. & Giovannoni, M. Sobre a ação da terramicina na toxoplasmose experimental. [**On the Action of Terramycin on Experimental Toxoplasmosis**] *Arquivos Inst. Biológico.* S. Paulo. 1952–54, v. 21, 5–12.

The English summary appended to the paper is as follows:—

"From their experiments on the action of terramycin on animals experimentally infected with toxoplasmosis, the authors draw the following conclusions:

"1. The action exerted by terramycin on the experimentally induced toxoplasmosis is merely bacteriostatic, the organism of the host not being ridden of the parasite.

"2. The effective dose of the drug, when administered by the oral route, is 100 mg per kilo of body weight, given daily during three weeks.

"3. All the pigeons inoculated with Toxoplasma and treated with terramycin show complete resistance to the reinoculation of 10,000 LD 50%, made from 28 to 117 days after the first inoculation.

"4. In 20 pigeons inoculated with Toxoplasma and treated with terramycin it was possible to demonstrate the presence of the parasite in the host's body from 35 to 178 days after the initial infection. In 100% of the cases the parasite was found in the brain; in 60% of the cases it was found in the eyes and in 35% of the cases it was found in the liver and spleen, taken together.

"5. In 19 out of the 20 pigeons, above mentioned, all of them harboring toxoplasma, complement fixing antibodies were found, the titers being: 1:2, 1:4 and 1:32 in three cases (each), 1:8 in nine cases and 1:16 in one case.

"6. The Sabin-Feldman test, which was performed in 17 pigeons infected with Toxoplasma, gave positive results in all cases, the titers being 1:256 in 4 cases, 1:1024 in 8 cases, and 1:4096 in 5 cases.

"7. The cure of the experimentally infected pigeons, which were treated with terramycin, is therefore to be attributed not only to the drug itself but also, and in an active way, to the host's defence mechanism.

"8. This mechanism can easily explain the apparently paradoxical results obtained in the second experiment referred to in this paper, which showed

that the sooner did the treatment begin, the lesser were the percentages of cured animals. In that experiment the treatment was applied only during 10 days, a lapse of time not sufficient for the host to develop its own immunity."

[See also this *Bulletin*, 1954, v. 51, 1190.]

DERMATOLOGY AND FUNGUS DISEASES

Vanbreuseghem, R., Thys, A. & Henrot, L. Troisième cas congolais de rhinosporidiose. Considérations nouvelles sur la nature des sphérules. [**Third Case of Rhinosporidiosis in the Belgian Congo. New Observations on the Nature of the Spherules**] *Ann. Soc. Belge de Méd. Trop.* 1955, Apr. 30, v. 35, No. 2, 225–8, 3 figs. on 2 pls.

Three cases of rhinosporidiosis (*Rhinosporidium seeberi*) have been identified in the Belgian Congo. All 3 patients were girls and the polypoid lesions were connected with the conjunctival sac with no associated nasal lesion. The present report deals with the histological study of the specimen from the third case.

Ashworth [this *Bulletin*, 1923, v. 20, 451], in his classical study of *R. seeberi*, described the great parasitic sporangium filled with spherical, thick-walled spores of various sizes, which represented the simplest form of the parasite. Within the spores, in addition to a single nucleus, were several spherical bodies which he regarded as representing a reserve of protein material.

By the use of the newer methods of staining, which serve to demonstrate the chemical nature of materials in tissue sections, Vanbreuseghem has been able to put forward evidence impugning the accuracy of Ashworth's interpretation of the nature of the "spherules". In sections stained by the Hotchkiss-MacManus method, the inner layer of the sporangial membrane, the limiting membrane of the "spores" and the outline of the spherules all stained alike, showing that the spherules are discrete cells with a limiting membrane containing polysaccharide material. In sections stained by the Feulgen technique the apparent single nucleus of the "spores" seen by Ashworth in haematoxylin-stained sections was not evident, but in some of the spherules there could be seen a reddish-violet point or granule of deoxyribonucleic acid, indicating a nucleus. By the reaction of Polister, it was shown that the content of the spherules was protein, confirming Ashworth's observation.

It is evident that the "spherules" are not, as Ashworth supposed, merely reserves of protein material in the spore, but are independent cells with a well defined polysaccharide cell wall, a nucleus and protein contents. In fact, the spherules appear to be the true spores and the "spores" of Ashworth daughter sporangia.

The clear photomicrographs give convincing support of Vanbreuseghem's hypothesis. *J. T. Duncan*

Baum, G. L. & Schwarz, J. **Coccidioidomycosis: a Review.** *Amer. J. Med. Sci.* 1955, July, v. 230, No. 1, 82–97. [139 refs.]

Gordon, L. E., Smith, C. E. & Wedin, D. S. **Nystatin (Mycostatin) Therapy in Experimental Coccidioidomycosis.** *Amer. Rev. Tuberculosis.* 1955, July, v. 72, No. 1, 64–70, 3 figs. [12 refs.]

The disappointing results hitherto achieved in the chemotherapy of coccidioidomycosis makes the search for new drugs, for this purpose, more urgent.

The antibiotic nystatin, originally named fungicidin [*Bull. Hyg.*, 1951, v. 26, 643], and now marketed under the name Mycostatin, has been shown in various reports to be fungistatic, *in vitro*, to cultures of *Coccidioides immitis* at concentrations of 1·56 to 7·5 μgm. per ml. of the culture medium, and with tests *in vivo* it has been shown by Newcomer *et al.* (*J. Investigative Dermat.*, 1954, v. 22, 431) to be effective in reducing the mortality rate in mice experimentally infected by *C. immitis*.

In the present study, tests *in vitro* showed the effective fungistatic concentration of nystatin for *C. immitis* to be about 100 μgm. per ml. in an asparagine, synthetic, liquid medium. The difference between this figure of the fungistatic concentration, and those quoted above, may be accounted for by the longer period of incubation and observation of the culture (30 days at 37°C.) in the later tests, which permitted delayed growth to be observed; a concentration of 10 μgm. per ml. caused a temporary suppression of growth which, however, developed after the tenth day.

For the tests *in vivo*, crystalline nystatin, added to sterilized, buffered isotonic saline of *p*H 7·4, was administered by subcutaneous injection. A healthy 25 gm. mouse could tolerate daily injections of 2·0 mgm. nystatin for 10 days. Mice infected by intraperitoneal injection of the fungus were treated with daily subcutaneous injections of the antibiotic for 5 days, and after an interval of 2 days the injections were resumed for another 5 days, and so on up to the thirtieth day. Observation of the animals was continued for a further 45 days after cessation of treatment.

The results showed that when treatment was commenced on the day of infection, many of the treated animals survived the 75 days; the death rates being 13 per cent. in mice on a daily dose of 1·0 mgm. nystatin, 28 per cent. in those receiving 0·5 mgm. daily and 100 per cent. in the control, untreated group. All of the animals which died showed extensive pulmonary and visceral lesions, and those which survived and were killed after the experiment also showed visceral lesions but less severe pulmonary involvement, although the infection was still active.

From other experiments, it was shown that the effect of nystatin in reducing the death rate diminished progressively as the interval between the time of infection and the commencement of treatment increased. so that a death rate of 75 per cent. was recorded when the interval was 10 or 12 days. When treatment was withheld until deaths began to occur among the infected mice (about the fourteenth day of infection) and the disease would approximate to the severe disseminated type in man, nystatin, even in doses of 2·0 mgm. daily, had little effect on the ultimate death rate which was 93 per cent. in the control mice and 89 per cent. in the treated mice; nevertheless, the treatment caused a definite increase in the survival time.

The results may not be impressive, but the authors consider that the dosage employed in these experimental studies, which was based on the earlier reports of tests *in vitro*, may have been too low.

A clinical trial of nystatin in coccidioidomycosis of man is warranted.

J. T. Duncan

HEAT STROKE AND ALLIED CONDITIONS

Angrisani, V. Effetti del clima della zona di Bender Cassim (Golfo di Aden) sull'organismo umano durante il Kharif (stagione calda). [**Effect of the Climate of Bender Cassim, Gulf of Aden, on the Human Organism during the Hot Season**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1955, Apr., v. 36, No. 4, 173–215. English summary.

Bender Cassim, Italian Somaliland, lies near the eastern extremity of the south shore of the Gulf of Aden. Its climate differs but little from that of the adjoining coastal area of British Somaliland. During the hot season, May to September, the climate may be almost unbearable. In July the mean maximum temperature is 41·1°C., the mean minimum temperature 32·6°C., with a relative humidity, near the sea, of 80 to 90 per cent. Experience during two successive hot seasons in Bender Cassim supplies the material for this long dissertation on the deleterious effects of the arduous climate on the human organism. Separate sections of the report deal with the effects of climate on the heat regulative apparatus, the neuropsychic and endocrine systems, the respiratory system, the circulatory system. the digestive and excretory systems, the eyes, and the skin.

Norman White

MISCELLANEOUS DISEASES

Davies, J. N. P. **Children's Diseases at Mulago Hospital 1950–51. An Analysis of the Causes of Admission.** *East African Med. J.* 1955, July, v. 32, No. 7, 283–90.

Three years have elapsed since this paper was first read. The primary causes of admission of 2,649 children up to the age of 10 years to the largest hospital in Uganda are analysed. Malaria was a major cause of admission until about the sixth year when there was an abrupt reduction. In the neonatal period and to a less extent for the remainder of the first 9 months of life malaria was responsible for a much greater percentage of non-Ganda admissions (64 per cent.) than of Ganda (6 per cent.). The reasons for this are not clear. The admissions may not altogether represent the incidence and severity of the disease as it occurs in the homes but it is possible that the immunity handed on by non-Ganda mothers is less effective against local strains of parasite than that inherited by Ganda babies.

Respiratory diseases (excluding tuberculosis, measles and whooping cough) were responsible for 741 admissions and 53 deaths compared with 865 admissions and 37 deaths from malaria. Kwashiorkor occurring chiefly from 12 months to 3 years of age had its peak incidence at 18 months. Marasmus was almost entirely diagnosed during the first year of life. Gastroenteritis was surprisingly uncommon: malaria was usually found to be responsible for the vomiting and diarrhoea with which children were frequently admitted. *Haemophilus influenzae* was the commonest cause of meningitis. Acute or chronic nephritis was rare. Pyomyositis, excluding cases thought to be due to injections, was recorded in 36 cases. Respiratory disease, malaria, malnutrition and tuberculosis, in that order, were the major causes of death.

The author is careful to point out that the material is not necessarily fully representative of the diseases prevailing in the homes but nevertheless

the data are of interest particularly in showing the importance of respiratory disease and malaria in children living in a hyperendemic tropical zone and will serve as a yardstick for future comparison. *Frederick J. Wright*

Achar, S. T. **Childhood Hepatic Cirrhosis in India. Some Aspects.** *Indian J. Child Health.* 1955, June, v. 4, No. 6, 291–8, 10 figs. on 4 pls.

Hepatic cirrhosis in infancy and childhood is unusually high in many parts of India owing to the prevalence of a peculiar type of cirrhosis commonly known as infantile biliary cirrhosis or Indian infantile hepatic cirrhosis but which the author considers would be more accurately termed Indian early childhood cirrhosis.

In an attempt to define this condition more accurately the author and his colleagues in the Paediatric Department, Madras, have made a detailed study during the last 6 years of 249 cases of childhood cirrhosis. The cases seemed to fall into 8 groups as follows:—

1. Indian early childhood cirrhosis	170 cases
2. Post-infective hepatitis cirrhosis	20 cases
3. Intermediate or indeterminate between Groups 1 and 2	22 cases
4. " Cirrhosis liver associated with fatty change " ...	14 cases
5. Laënnec's portal cirrhosis	10 cases
6. Congestive splenomegaly (Banti's syndrome)	5 cases
7. Neonatal cirrhosis	4 cases
8. Congenital obliteration of bile ducts	2 cases

In addition 2 children developed cirrhosis shortly after treatment of kala azar by antimony salts.

There were no cases attributable to congenital syphilis. Another study made by the author of biopsy material suggests that children with congenital syphilis are either cured or die before cirrhotic changes become manifest.

A helpful table sets out the main differences between Groups 1, 2 and 4 in frequency of occurrence, age incidence, incidence in siblings, clinical course and mortality rates and histology of the liver as seen in biopsies and at post mortem.

Cases of Indian early childhood cirrhosis differ markedly from those in Group 4 which benefit from a high protein diet. The aetiology of the former is obscure although its relative frequence in siblings and rarity among the poorer classes receiving a low protein diet are features peculiar to this group alone. Sixty per cent. of this group die within 3 months to 3 years from the onset of symptoms. The value of therapy is difficult to assess.

[A lucid and valuable paper.] *Frederick J. Wright*

PARASITOLOGY: GENERAL

Levine, N. D. **A Punched Card System for Filing Parasitological Bibliography Cards.** *J. Parasitology.* 1955, Aug., v. 41, No. 4, 343–52, 2 figs.

Hutner, S. H. & Lwoff, A. **Biochemistry and Physiology of Protozoa.**

This book is reviewed on p. 1248.

Mohr, W. Protozoeninfektion als Ursache von Myokardschäden in den Tropen. [**Protozoal Infection as a Cause of Myocardial Disease in the Tropics**] Reprinted from *Verh. Deut. Ges. inn. Med.* München. 60. Kongress 1954, 603–7.

This is a short interesting discussion of the direct or indirect cardiac effects of protozoal infections. Lesions developing in *P. falciparum* malaria, *T. rhodesiense* and *T. gambiense* trypanosomiasis, Chagas's disease, kala azar and toxoplasmosis are briefly discussed. The author concludes that the diagnosis " tropical myocarditis " belongs to an amorphous and indefinite group of syndromes including " tropical anaemia " and " tropical myositis ". The term should be avoided. In any given case the true aetiology should be sought. Authors are mentioned in the text but unfortunately no list of references is given. *B. G. Maegraith*

Torricelli, C. & Malandra, B. Prime osservazioni in Italia della *Pneumocystis carinii* nella polmonite interstiziale plasmacellulare. [**First Observations in Italy of *Pneumocystis carinii* in Cases of Interstitial Plasmacellular Pneumonia**] *Giorn. di Malattie Infettive e Parassit.* 1955, Jan., v. 7, No. 1, 3–6, 3 figs.

Between 1947 and 1953, the senior author and his associates recorded, in Milan, 39 cases of interstitial pneumonia in infants. To these the present authors add 25 new cases observed in Milan up to the beginning of 1954. Among these infants, 12 were born prematurely, and in 13 the weight at birth was between 2,500 and 3,700 gm., the great majority being in a state of dystrophy. The mortality among these cases was 20 per cent., which is lower than that recorded in the literature. In these 5 patients post-mortem examination of the lungs revealed the characteristic histopathological changes of the disease (which are described in detail and illustrated), and *Pneumocystis carinii* was found in the bronchioles and alveoli of all of them.
C. A. Hoare

Laursen, Helga. Interstitiel plasmacellepneumoni hos praematurer. [**Interstitial Plasmacellular Pneumonia in Premature Babies**] *Nordisk Med.* 1955, Aug. 18, v. 54, No. 33, 1285–8, 4 figs. [21 refs.]

The English summary appended to the paper is as follows:—
" Three cases of interstitial plasmocellular pneumonia are reported. Two patients died, one recovered. Autopsy of two of the patients showed typical pathological changes and in each case the parasite Pneumocystis carinii was found. All the three patients were treated with atebrin."

Uhlenhuth, P. & Schoenherr, K. E. Untersuchungen über die Übertragungsmöglichkeiten verschiedener Trichomonadenarten auf kleine Versuchstiere. [**Investigations on the Transmissibility of Various Trichomonads to Small Laboratory Animals**] *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1955, Jan., v. 112, No. 1, 48–56.

The authors describe experiments on the transmission of the human and bovine genital parasites, *Trichomonas vaginalis* and *T. foetus*, to laboratory rodents, *viz.*, guineapigs, rabbits, golden hamsters. The inocula were either obtained from infected women and bovines, or were represented by cultures of the corresponding trichomonads, in Lash's and egg media. In all the experiments the infective material was introduced into the vagina of female animals, but in some cases it was inoculated intravenously, intraperitoneally,

intramuscularly, subcutaneously or intracerebrally. In the case of vaginal inoculation, either pipettes were used or cotton-wool plugs soaked in culture were inserted.

Attempts to infect rabbits and guineapigs by inoculation of *T. vaginalis* and *T. foetus* into the vagina produced negative results in all cases, except in one guineapig. But in this case pathological changes were already present in the vagina, and *T. foetus* survived for only 24 hours. Likewise, the results were negative both in these rodents and in hamsters after parenteral inoculation of the two trichomonads.

However, in hamsters vaginal inoculation of both trichomonads resulted in a lasting infection, which was transmissible in serial passages through these animals. But whereas the infection rate with *T. foetus* was 100 per cent., infection with *T. vaginalis* succeeded only in 20–30 per cent. of cases, and there was evidence that it was inhibited by the presence in hamsters of natural infections with a flagellate resembling *T. ardin delteili*. Though infection with *T. foetus* extended to the uterus of hamsters, it had no effect on their conception or course of pregnancy.

It is concluded that the hamster is a suitable experimental animal for the study of therapeutic and immunological problems in human and bovine trichomoniasis. *C. A. Hoare*

Deschiens, R. & Litalien, F. Le test à l'A.C.T.H. dans les éosinophilies parasitaires à taux modéré. [**The Thorn Test in Parasitic Eosinophilia of Moderate Degree**] *Bull. Soc. Path. Exot.* 1955, v. 48, No. 2, 222–6.

Further pursuing this subject [see this *Bulletin*, 1955, v. 52, 563; and v. 52, 1022] the authors now turn their attention to parasitic eosinophilias of moderate degree, as opposed to those of gross degree. They give material details [in a table] of 14 persons in Guadeloupe, infected with one or more of a variety of worms, each with a moderate degree of eosinophilia which they attribute to the presence of the parasites, and detail the effect of the intramuscular injection of 25 mgm. of corticotrophin on their eosinophil counts. From the data it would seem that when the degree of eosinophilia is less than 20 per cent. it commonly is reduced by the injection; when it is over 30 per cent. it usually is not reduced. The positivity or negativity of the test is dependent on the capacity to react of the suprarenal cortex. Slight degrees of eosinophilia are associated with fatigue of the suprarenal, and so are responsive to corticotrophin administration, whereas high degrees of eosinophilia are associated with great activity of the suprarenal and are irreducible under the same conditions. *A. R. D. Adams*

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Peters, W. **The Mosquitoes of Liberia (Diptera: Culicidae).** *Proc. Roy. Entom. Soc. of London.* Ser. B. 1955, June 22, v. 24, Pts. 5/6, 81–90, 5 figs.

Peters, W. **New Anophelini from the Southern Highlands of Tanganyika and Notes on some other Members of the Genus *Anopheles* Meigen (Diptera: Culicidae).** *Proc. Roy. Entom. Soc. of London.* Ser. B. 1955, June 22, v. 24, Pts. 5/6, 95–103, 3 figs.

There is no evidence that these species transmit malaria.

Saccà, G. Ricerche preliminari sui rapporti intercorrenti fra *Musca domestica cuthbertsoni* Patton e *Musca domestica vicina* Mq. (Diptera, Muscidae). [**Preliminary Research on the Relations existing between *Musca domestica cuthbertsoni* Patton and *Musca domestica vicina* Mq**] *Rendiconti Istituto Superiore di Sanità.* Rome. 1955, v. 18, Pt. 5, 384–405, 14 figs. (7 on 4 pls.). [16 refs.] English summary.

This is a study of the differential morphology and biology of 2 forms of *Musca domestica* occurring in North Africa, *viz.*, *M. d. cuthbertsoni* and *M. d. vicina*, with some reference to the typical form *domestica*.

The author finds that *M. d. cuthbertsoni* and *M. d. vicina* maintain a clear distinction in nature in spite of the fact that they coexist in widely overlapping habitats and that there is complete interfertility. There is also complete interfertility of *Musca domestica domestica* and *M. d. cuthbertsoni*.

Entomologists with particular interest in this group of flies should consult this paper in the original. *H. S. Leeson*

Lichtwardt, Elizabeth T., Bruce, W. N. & Decker, G. C. **Notes on the Inbreeding of House Flies.** *J. Econom. Entom.* 1955, June, v. 48, No. 3, 301–3, 1 fig.

" A method is described for raising house flies from a sufficient number of single females to insure continuation of an inbred strain. Methods for handling mass cultures of inbred strains are also described. Two strains have been successfully inbred through 10 to 16 consecutive generations by the use of these techniques. One inbred strain (IR-1) resistant to DDT carries a single autosomal recessive genetic marker, an incomplete or " broken " subcostal wing vein. The other inbred strain (IS-1) susceptible to DDT carries pigmented abdominal sclerites, the inheritance of which is unknown. Both inbred strains were selected for fertility alone during the inbreeding process, the resistant strain increasing in resistance, the susceptible strain maintaining its susceptibility to DDT. Each strain appears to be, in general, phenotypically homogeneous."

McCauley, R. H., Jr., Grainger, Mary M., Lindquist, D. A. & Fay, R. W. **Laboratory Comparison of some Insecticides as Larvicides against Nonresistant House Flies.** *J. Econom. Entom.* 1955, June, v. 48, No. 3, 269–73.

" Seven chlorinated hydrocarbon insecticides, DDT, methoxychlor, toxaphene, benzene hexachloride (95 per cent gamma isomer content), chlordane, dieldrin, and aldrin, were tested as larvicides in spray applications of emulsion formulations on the surface of breeding media at −1, 1, 3, and 5 days from the introduction of newly hatched larvae of nonresistant house flies. The effectiveness of dosages ranging from 2·5 to 1250 mg. of insecticide per sq. ft. was determined on the numbers of pupae and of defective and normal adults in treated cultures compared with check cultures.

"On 5-day-old cultures containing mainly pupae and some full-grown larvae only chlordane at dosages of 250 to 1250 mg. per sq. ft. gave reductions of at least 70 per cent making it the best insecticide for general effectiveness. Against −1 to 3-day-old cultures, BHC, aldrin, toxaphene and dieldrin were more effective than chlordane at dosages below 250 mg. per sq. ft. BHC (95 per cent gamma isomer content) appeared to be the most active, giving complete mortalities at 25 mg. per sq. ft. and eliminating almost all the fly larvae before they could pupate."

HARTLEY, C. F. **Rearing Simuliids in the Laboratory from Eggs to Adults.** *Proc. Helminthological Soc. of Washington.* 1955, July, v. 22, No. 2, 93–5, 1 fig.

It is well known that blackflies (Simuliidae) require running water for breeding. In this note the author describes a method for rearing the eggs of *Simulium venustum* to the adult stage. The apparatus which is described and figured, consists of an ordinary aquarium into which water is constantly pumped. From this reservoir the water is siphoned off through glass tubes into 4-oz. jars, thus providing a constant stream of running water. The rate of water flow from the siphons can be adjusted by varying the distance between the siphon outlet and the surface of water in the aquarium. Blades of grass with the eggs are suspended inside the jars. The larvae on hatching attach themselves to the inner and outer surfaces of the jar and usually pupate on the outer surface near the neck and the bottom of the jar where the water is running off. Pupae are removed after 3 days and placed in rearing vials for the emergence of the adults. One of the advantages of this method is that the aquarium can be used as a reservoir for siphoning off water into several jars; thus individual batches of eggs can be reared separately at the same time.

The author mentions that the use of copper filters to prevent the escape of the larvae and the entry of predators proved highly toxic to the larvae and resulted in their death. The failure to keep the larvae alive by LEA and DALMAT [this *Bulletin*, 1954, v. 51, 1314] may have been due to their use of copper tubing to lead the water into the experimental vessels.

M. G. R. Varma

DIAS, J. A. T. S. Tabanídeos (Diptera, Tabanidae) de Moçambique colhidos pela Missão de Estudo do "Instituto de Medicina Tropical". [**Tabanids of Mozambique collected by the Missão de Estudo do Instituto de Medicina Tropical**] *Anais Inst. Med. Trop.* Lisbon. 1955, Mar.–June, v. 12, Nos. 1/2, 155–81, 2 figs. [25 refs.] English summary.

DIAS, J. A. T. S. Contribuição para o conhecimento da fauna ixodológica do Sudoeste Africano. [**Observations on Ixodid Ticks of South-West Africa**] *Anais Inst. Med. Trop.* Lisbon. 1955, Mar.–June, v. 12, Nos. 1/2, 75–100, 5 figs. [39 refs.] English summary.

HOOGSTRAAL, H. **Notes on African *Haemaphysalis* Ticks. II. The Ground-Squirrel Parasites, *H. calcarata* Neumann, 1902, and *H. houyi* Nuttall and Warburton, 1915 (Ixodoidea, Ixodidae).** *J. Parasitology.* 1955, Aug., v. 41, No. 4, 361–73, 40 figs. [14 refs.]

The adults, nymphs and larvae of the two ground-squirrel ticks *Haemaphysalis calcarata* and *H. houyi* are described in full and their morphological differences are illustrated.

A study of locality records shows that *H. calcarata* occurs on *Xerus rutilus* which ranges in East Africa through Somalia and those parts of Kenya and Ethiopia which lie east of the Rift Valley, while *H. houyi* is known only from localities within the range of *Euxerus erythropus* which extends in a belt across the widest part of Africa from the Atlantic coast of West Africa through the Anglo-Egyptian Sudan and Uganda to those parts of Ethiopia and Kenya which lie west of the Rift Valley. A map shows the distribution of the ground-squirrels and their tick parasites.

These ticks are distinct from the ubiquitous *H. leachi*, a well-known disease vector with which *H. houyi* has sometimes been confused though it occurs but very seldom on ground-squirrels. Should future investigations show that these ticks and their hosts are infected with disease-causing organisms the factors discussed in this paper will require further study from the epidemiological viewpoint. *H. S. Leeson*

Derrick, E. H. **A Tetranychid Mite which may attack Man.** Reprinted from *Australian J. Sci.* 1954, Oct., v. 17, No. 2, 67–8.

Some red spider mites are known to irritate the human skin. In this note the author records that in August 1949 an undescribed subspecies of *Paratetranychus insularis* was observed to bite man in the Brisbane suburb of Taringa. Wheals developed 10–15 minutes after a bite and persisted for 45–166 minutes. One red itchy spot was still present 3½ hours after the mites were applied. The mites came from a heavy infestation occurring on a Rangoon creeper (*Quisqualis indica*). The aggressive habits of other Tetranychid mites are very briefly mentioned. *H. S. Leeson*

Davidson, G. **Residual Insecticides.** Ross Institute Industrial Advisory Committee: Information and Advisory Service. London School of Hygiene and Tropical Medicine. Bull. No. 1, re-written June, 1955 (originally issued May, 1949, revised March, 1952), 29 pp. [12 refs.]

MISCELLANEOUS PAPERS

Brotmacher, L. **Medical Practice among the Somalis.** *Bull. History of Med.* 1955, May–June, v. 29, No. 3, 197–229, 2 figs. [12 refs.]

It is quite important that medical practitioners in African countries should be well aware of the beliefs of the people about the causation of disease, since these normally differ fundamentally from our own, and are extremely important to the well-being of the people. These beliefs are part of the social and cultural structure, and are held with the tenacity of a conservatism which fears the disruption of any part of its tradition. There is probably some justification for the notion that if the power of the supernatural world is denied by another, and alien, approach to the problem of disease, those who are led astray by this alien view might go further and lose touch with traditional beliefs and customs in matters other than health and disease. Where disease is regarded as punishment for non-observance of religious practices, religion itself is in danger of losing authority. The detribalized African, who has lost his traditional loyalties

and who has not been able to replace them by other loyalties as dignified as those he has lost, is a tragic and unhappy figure.

Yet, of course, the practitioners of western medicine must attempt to change the African conceptions of disease, partly by implication when they show that modern treatment and preventive measures are effective, and partly by the direct teaching they give in their training of medical assistants and nurses. It is, perhaps, in the field of medicine, which is generally recognized to be a benign influence, and in which results can be swift and striking, that the best argument lies in favour of the undogmatic, empirical, habit of mind which can be called civilized and free.

In this careful and detailed paper the author gives a large amount of information on the beliefs of the Somali people relating to anatomy and physiology, the causation and prevention of disease, treatment, surgery, gynaecology and obstetrics, paediatrics, and forensic medicine and toxicology. These are his own headings, and they perhaps would convey to the reader rather too scientific a notion were it not for the clarity and simplicity of the text. Somali medicine consists mainly of features imported from Arabia and adapted to local conditions; it need hardly be stressed that Islam is a powerful influence, as is the belief in the intervention of spirits and the potency of charms. Yet contagion is recognized as the means of spread of such diseases as smallpox, tuberculosis and syphilis, but the Somalis have not carried the logic through to the point of avoiding contact through overcrowding. The main difficulty, however, is not in the capacity for logical thought, but in the uncritical acceptance of unproved assumptions, and the attitude of mind which does not even contemplate the possibility of critical assessment. *Charles Wilcocks*

Janssens, P. G. La pathologie des coloniaux en congé. [**Morbidity among Colonials on Leave**] *Bruxelles-Méd.* 1955, May 15, v. 35, No. 20, 979–84.

An ex-colonial doctor gives his impressions of practice among colonials on leave. Not more than 8 per cent. of the morbidity encountered could be classed as of strictly tropical origin now that the health situation of Europeans abroad is " brilliant ". Fever, diarrhoeas, oedema and asthenia comprise the majority. Supposed malaria often turns out to be a urinary infection, and colonials are as prone as others to anal fissures and piles. " Tropical liver " is generally no more than the effect of dietetic or alcoholic indiscretion. The author states that only the vegetative forms of *E. histolytica* are concerned in the pathology of amoebiasis and that the pre-cystic forms are but harmless commensals while the cysts are solely concerned with the propagation of the species. [But somewhere in the bowel wall vegetative forms must be giving birth to these forms.]

The well known methods of clinical pathological diagnosis outlined for most common diseases due to helminths or protozoa are described and it is claimed that detection is neither mysterious nor difficult if the possibility of tropical disease is borne in mind. *C. C. Chesterman*

Cotronei, G. **Battista Grassi: a Pioneer in Biology and Medicine.** *Scientia Med. Italica.* 1955, Apr.–June, v. 3, No. 4, 577–91.

REPORTS AND SURVEYS

Sergent, Ed. Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1954. [**Annual Report of the Institut Pasteur d'Algérie for 1954**] *Arch. Inst. Pasteur d'Algérie.* 1955, June, v. 33, No. 2, 150–94. [Numerous refs.]

The first part of this Report consists of short accounts of various research problems. These have already been published in the literature and readers of this *Bulletin* and the *Bulletin of Hygiene* will be familiar with them. They include malaria, epidemiology of tuberculosis and BCG vaccination, trachoma, relapsing fever, parasitology and entomology.

The second part sets out details regarding courses of instruction, publications, special surveys, quantities of biological products maintained and issued and stock cultures held. This section also gives the usual details of the anti-rabies service during the year. Among 1,261 " individual observations " noted in respect of persons treated with anti-rabies vaccine, 521 were Europeans and 740 Africans. There were 7 deaths among treated persons and 6 deaths from rabies among untreated persons.

The third part of the Report gives a list of routine examinations, which totalled 20,816 in 1954. Of these 6,758 were microbiological, 1,517 biological or histological, 5,772 chemical and 6,769 zoological determinations.

There were 21,000 dogs vaccinated or revaccinated in 1954: 4 of these died, but they had not had the statutory revaccination within 7 days of having been bitten. Vaccination of dogs has been compulsory since 1951 in communes where rabies has been declared to exist; in 1954, there were 281 communes thus designated, 96 in Algiers, 126 in Oran and 59 in Constantine.

The Report ends with a short account of the activities of the experimental station at the Ouled Mendil Marsh. *H. J. O'D. Burke-Gaffney*

See also p. 1126, Leite *et al.*, Relatório da Missão do Instituto de Medicina Tropical a Angola (1954) em colaboração com a Missão de Prospecção de Endemias em Angola. [**Report of the Mission of the Institute of Tropical Medicine to Angola (1954) in Collaboration with the Mission for Endemic Diseases of Angola**]

BOOK REVIEWS

Hackett, C. J. [M.D., F.R.C.P.], with the cooperation of J. J. C. Buckley, D.Sc. & the late F. Murgatroyd, M.D., F.R.C.P. **Manual of Medical Helminthology.** pp. ix + 330, numerous figs. 1954. London: Cassell & Co. Ltd., 37/38, St. Andrew's Hill, E.C.4. [18s. 6d.]

A manual on medical helminthology written by Dr. Hackett, with his unrivalled knowledge of how best to demonstrate by letterpress, illustrations, models and preserved specimens the varied aspects of parasitology to students of medicine, and with the cooperation of such distinguished specialists as Professor Buckley and the late Professor Murgatroyd, is bound to contain clear and reliable information. It does not necessarily follow, however, that the information supplied will be well adapted to the use of the average medical officer, whose acquaintance with zoology ceased with

the passing of his pre-clinical examinations. The reviewer therefore delayed judgment of this book until he had subjected it for two terms to the acid test of use in the teaching of students attending courses for the Diploma of Tropical Medicine and Hygiene and the Diploma of Public Health. At the end of that not inconsiderable test he can say at once that the work has proved of sound worth, and amply fulfils the aim of its authors to provide for " doctors in the tropics " a text-book containing " knowledge useful to the man in the field ".

The introduction occupies 38 pages, the first 30 of which are devoted to brief introductory accounts of the aetiology, life cycles, epidemiology, and pathology of the trematodes, cestodes and nematodes; the remaining 8 pages of the introduction are occupied with a general account of the simpler laboratory procedures, such as are available in most general hospitals, for the diagnosis of helminth infections, and with a brief summary of the principles governing treatment, prognosis and prevention. The condensation of such varied aspects of generalized medical helminthology into so small a space has resulted in the inclusion of a number of dogmatic statements on subjects which most workers regard as still open to discussion. Such partiality is perhaps unavoidable in so condensed an account, and, on the whole, the authors' opinions are those most generally held, and are expressed clearly and without the omission of essentials.

The rest of the book, with the exception of the last 10 pages, which contain diagrams and tables illustrating the common parasitic helminths and some of their molluscan vectors, is devoted to accounts of those species of helminths which are commonly found parasitizing man. In all, 31 species are individually considered in the following detailed manner:— (1) *General* (this includes a general description and a brief historical summary); (2) *Aetiology* (including a description of the morphology and of the habitat and life-span of the parasite in the human host); (3) *Life-cycle*; (4) *Epidemiology* (subdivided into (a) transmission, (b) vectors, (c) reservoirs, (d) incidence and (e) geographical distribution); (5) *Pathology* (including clinical manifestations caused by the presence of the parasite); (6) *Clinical and laboratory methods of diagnosis*; (7) *Treatment*; (8) *Prognosis*; and (9) *Prevention*. This somewhat elaborate framework might, at first sight, appear unnecessary in an introductory text-book, particularly in the case of infections caused by helminths about which little is known; nevertheless, it is well suited to the needs of students, since it ensures uniformity and balance, and leaves the reader in no doubt as to whether omission of information on any particular aspect is deliberate or accidental.

The book is well produced, and the letter-press and illustrations are excellent. There is an adequate index, a very important part of a book intended for the use of medical officers in the field.

The authors invite constructive criticism which " would assist in making any future editions fulfil the purpose for which this one has been published ". The reviewer believes that future editions will be called for, and he therefore tentatively offers the following suggestions. (1) In a book of so practical a nature it would be of value to include a short section on methods of collecting and examining parasitic helminths at all stages of their development, and of preserving such material for future examination. (2) The 4 plates at the end of the book illustrating helminth eggs, scolices of tapeworms, gravid cestode segments, and microfilariae are all duplicates of illustrations already given in the text; they might well be omitted, and the space thus saved might be utilized for the purpose referred to in (1) above. The same criticism applies to the plates illustrating snail vectors, and the reviewer doubts whether the chart of the mollusca is likely to help

either the specialist or the novice. Other possible omissions might also include the references and illustrations concerning the caudal bursae of *Ancylostoma duodenale* and *Necator americanus*, since both species are much more easily identified by their mouth capsules, as is clearly shown elsewhere in the book. (3) The following corrections are suggested: (a) page 48: "*Tropicorbis centrimetralis*" should read "*Tropicorbis centimetralis*"; (b) page 253: "*Mansonioides*" should read "*Mansonia*"; (c) on *Trichinella spiralis* (page 191) the statement is made that "calcified larvae are just visible to the naked eye; if observed the whole carcass should be condemned"; but of "*Cysticercus cellulosae*" (page 153) it is stated that "highly infected carcasses may be cooked but in most circumstances they should be condemned"—a piece of advice which seems dangerous. (4) On infestations with *Strongyloides stercoralis* the views expressed regarding parthenogenesis and auto-infection, although quite possibly true, are not universally accepted, and it might be advisable to make this fact clear to the student; the same clarification might be applied also to the statement on page 1 that "in man worms may cause disease by their presence in the tissues, by their competition with their human host for food, or by the liberation of toxic substances". (5) Finally, observations made during the recent epidemic of trichinosis in Liverpool do not confirm the view, expressed on page 189, that "the precipitin and intradermal tests are regarded as more useful than biopsy". *R. M. Gordon*

Hutner, S. H. & Lwoff, André [Edited by]. **Biochemistry and Physiology of Protozoa. Vol. II.** pp. xiii + 388, numerous figs. 1955. New York 10: Academic Press Inc., 125 East 23 Street. London: Academic Books Ltd., 129, Queensway, W.2. [$9.00.]

This second volume will be welcomed as complementary to the first which appeared in 1951 [this *Bulletin*, 1952, v. 49, 459]. In the present volume, the subject-matter ranges over a wide field of topics and many more remain to be discussed so there is reason to hope that other volumes in the series may follow. In the introduction by S. H. Hutner it is suggested that protozoa, at least those which can be maintained in pure culture, have recently become more popular for biochemical studies. In this respect protozoologists have contributed a great deal to comparative biochemistry. The complexity rather than the simplicity of protozoa, is, however, stressed. Major groups, especially those whose habitat is the sea, still await investigation. Some biochemists on the other hand stick to the beaten track and in their own jargon "belabor the point that protozoal protoplasm resembles other protoplasm". This colourful and entertaining introduction makes imaginative comment on a wide range of topics and is followed by a chapter on Comparative Biochemistry of Flagellates by the same author with L. Provasoli who jointly contributed an article on The Phytoflagellates in the first volume. This chapter deals mainly with phagotrophy and biochemical uses of flagellates and a remarkable range of topics is discussed including origins, nutrition, sexuality, drug resistance and vitamin requirements. It is pleasing to note that some Trypanosomidae have been included. The chapter on the Composition and Synthesis of the Starch of *Polytomella coeca* by S. A. Barker and E. J. Bourne is of a purely chemical character and indicates another striking biochemical use of protozoa, in contributing to a comparative biochemistry of sugar metabolism. The method of synthesis of amylose, of linear structure, through phosphorylase from simple sugars and its conversion to the branched polysaccharide amylopectin, the

major component of the starch present, through the action of Q-enzyme, possibly a transglucosidase, is described. The starch so formed provides a source of energy. The use of this organism for the production of symmetrically labelled glucose and synthesis of ^{14}c-labelled proteins, in turn a source of labelled amino acids, adds considerably to its interest. In the article by W. J. Van Wagtendonk on the Nutrition of Ciliates the author has done much to supplement the scanty knowledge of protozoan metabolism which he bewails. Without minimizing the difficulties, he is reasonably hopeful that axenic cultures of all protozoa in defined medium may become a reality. The complexity of protozoan requirements has tended to limit development in this field. He believes there is a possibility that this phylum may reveal essential metabolites of a novel type not so far recognized. The work reviewed suggests that complicated nutritional systems are yielding to analysis. Certain aspects of the importance of steroid metabolism are brought to light. In the short article on Encystment and Excystment of Protozoa by the same author, the complex nature of the factors involved are discussed. The conclusions of the different authors on the significance of these processes are however almost as varied as the organisms studied. It appears that essential metabolites may play an important rôle. Surprisingly enough, *E. histolytica* is not mentioned. The long and fascinating article by G. R. Seaman on the Metabolism of Free-Living Ciliates which follows, deals predominantly with the genus *Tetrahymena*. The reason for the large amount of research which has been carried out with this organism is that it is the only ciliate which so far can be maintained in pure culture on a defined medium. The small amount of protozoan material generally available for study, *Paramoccium* and *Tetryhymena* excepted, has not convinced the author that metabolic studies on protozoa are necessarily rendered more difficult, for present-day techniques allow micro or ultra-micro studies to be carried out with material available. The organic composition of cells and nature of reserves are discussed at some length and are followed by a detailed description of all aspects of cell metabolism. The key position of the recently characterized thioctic acid in the oxidation of pyruvic and other keto acids, in acyl transfer reactions and in protecting enzymatic reactions in cells from noxious substances such as trivalent arsenic, is indicated. The use of ciliates in chemotherapeutic studies, on the assay of hormones, vitamins and amino acids as well as in nutrition and other biochemical problems are discussed in turn. R. E. Hungate writes on Mutualistic Intestinal Protozoa. In dealing with rumen and termite protozoa he points to the paths still unexplored that may be followed in the future. It is clear, however, that much effort will have to be expended before the systems involved can be satisfactorily analysed. It appears that rumen protozoa are transferred from animal to animal by saliva and their function is still in doubt. Prevalent theories suggest that they help the host to digest cellulose or themselves serve as a source of protein. As anaerobes, rumen protozoa gain energy by fermentation. Osmotic pressure and acidity are important environmental factors. Bacteria present in these protozoa may be the agents which digest starch and cellulose. Wood-eating termites also contain bacteria which are believed to serve the same function as protozoa in other families. For various reasons quantitative studies on symbiosis, so far as the use of carbohydrates is concerned, have been easier in the case of insects than is possible with ruminants. A wide field of study is available. Speculative views on the rôle of symbiosis in evolution are included in an appendix to this chapter. In a second appendix the importance of carbohydrates as a source of energy for aerobes and anaerobes is discussed. A less familiar field is written about

by M. Sussman in his article on Developmental Physiology of the Amoeboid Slime Moulds. After tracing their cycle of development there follows a section on nutrition which indicates that a partially defined medium for growth is available. There is some evidence for the existence of chemotactic stimuli. "Acrasin" an unstable aggregation hormone which also plays a rôle in development may be endowed with generic specificity. These labile substances are frequently of great significance in studying biochemical mechanisms. In seeking by genetic, cytological and other methods to prove the existence of sexuality, the results have been equivocal. The author feels that much more work is required on the physiology and genetics of these slime moulds.

The factual account by L. G. Goodwin and I. M. Rollo—The Chemotherapy of Malaria, Piroplasmosis, Trypanosomiasis, and Leishmaniasis—will be of special interest to those whose work is concerned with these diseases in the field. Advances are claimed since the publication of Volume I. In the discovery of remedies, empiricism has not been less successful than of yore. The question of drug resistance in malaria has been a particular problem with some of the newer drugs. It seems a pity that so much time has been devoted in the laboratory to the production of resistance and cross-resistance without any real light having been thrown on the mechanisms involved. African human trypanosomiasis is no longer the serious problem it once was and the emphasis has shifted to the cattle forms of the disease which cause so much economic distress. Piroplasmosis among domestic animals is also of serious economic importance and new drugs are needed for treating *Theileria* infections. Many review articles have appeared in recent years on human amoebiasis, but that by W. Balamuth and P. E. Thompson on Comparative Studies on Amebae and Amebicides covers a much wider field. The range in size and character of the different amoebae types is remarkable. Nutritional studies have lagged behind those on other protozoa, largely for the reason that axenic culture of parasitic forms has not yet been achieved. As a result serodiagnosis and the development of new drugs based on biochemical observations have been hampered. A study of different substrates has indicated that amino-acids and proteins are of more importance than carbohydrates in nutrition, and the fields of comparative biochemistry have thereby been further expanded. In the parasitic group *E. histolytica* has received most attention on account on its clinical importance. The intense search for new amoebicides has not led to any notable success on the synthetic side, but some promising antibiotics have been discovered. A critical review of the *in vitro* methods used in testing new drugs is given and a timely plea for uniformity made, if the results are to mean anything. The novel method devised by Phillips in which *E. histolytica* is cultivated in presence of *T. cruzi* provided a noteworthy advance and indicates the probable need of *E. histolytica* for unstable substance which only living processes can provide. No laboratory animal appears to be entirely satisfactory for *in vivo* testing. It is not clear why amoeba normally infecting the golden hamster should be differentiated from that infecting other rodents by the name *E. criceti*. Types of drugs active against amoeba in different circumstances are formulated and discussed as well as the susceptibilities of different strains of parasitic amoebae to these agents. The final section deals with the mode of action of amoebicides and the question of acquired resistance to drugs. No unequivocal proof has been provided that resistance does in fact occur. An extremely interesting article to complete the volume!

The production is excellent with very few misprints in the text. On p. 10 *dipicts* occurs for *depicts*, on p. 134, *actyl* for *acetyl*, on p. 137, "The

bowel [bowl] is lined with three layers of filter paper ". On p. 235, Lewert is spelt Lewart and also in the index, while on p. 341, ref. 103, Joyner is given as Jaynes. Anyone interested in protozoology will be glad to possess this and its companion volume. *J. D. Fulton*

Lack, David [F.R.S.]. **The Natural Regulation of Animal Numbers.** pp. viii + 343, coloured frontispiece & 52 figs. 1954. Oxford: Clarendon Press. London: Geoffrey Cumberlege, Oxford University Press, Amen House, Warwick Square, E.C.4. [35s.]

The changes in the incidence of many insect-borne diseases depend on the way in which the population of their vectors increases and decreases. These fluctuations may occur naturally or may be caused, or intensified, by man's actions. This book deals with the general principles behind such fluctuations. It deals mainly with birds, on which so much work has been done, and medical entomologists may feel that work on tsetse flies and mosquitoes has been given too little prominence, but anyone interested in the quantitative side of animal ecology will find it helpful.

It is shown that the commonly held idea that an increase in the birth rate will cause a species to become more numerous is usually wrong. If, for instance, a species of bird (or an insect) lays more eggs, and there is no increase in food supply, there will be more competitors for that food and fewer and not more individuals will reach maturity. The reproductive rate of a species is evolved through natural selection, and is that which normally allows the greatest number to reach maturity. In a stable population, the birth and death rates balance each other, and an increase in density may encourage a higher death rate from food shortage, predation or disease.

It is important for those engaged in public health work and in insect control to understand these principles, so that they can direct their efforts to reinforce processes already effective and so obtain the maximum result with the minimum effort. *K. Mellanby*

Institut Pasteur D'Algérie. **Notice sur l'Institut Pasteur d'Algérie. Vol. I. Recherches scientifiques, enseignement et missions, applications pratiques, 1900–1934. Mission permanente 1900–1909. Institut Pasteur d'Algérie 1910–1934.** pp. viii + 374, numerous figs. Annexes. **I. Répertoire des publications. II. Tableau d'espèces nouvelles en histoire naturelle. 1900–1934.** 127 pp., illustrated. 1934: Algiers. **Vol. II. Recherches scientifiques, enseignement et missions, services techniques, 1935–1949.** 619 pp., numerous figs. 1949: Algiers. [Issued in 1955.]

These two volumes give a straightforward factual account of research into diseases of men, livestock and plants in Algeria and North Africa from 1900 to 1949. An introduction outlines the history of the foundation of the Institute, its subsequent development, personnel and equipment. Then follows a well-documented summary of progress made in the following fields: human microbiology and parasitology, with venoms, avitaminosis and poisoning; microbiology and parasitology of animals and birds; plant microbiology; immunology; rural economy; natural science; scientific exploration of the Sahara; and teaching and technical missions.

An appendix to Volume I lists the publications of the Institute, new species of plant and animal life discovered in the area and ethnographic discoveries from 1900 to 1934.

The work is illustrated profusely rather than well. Many of the maps, sketches, diagrams and photographs have reproduced badly and consequently tend to annoy rather than to illustrate. *John Rathborn*

Encyclopédie Médico-Chirurgicale. 1955. Receuil No. 33, Cahier 32, loose leaf pp., numerous figs. [Numerous refs.] **Maladies infectieuses** [Debre, R. (Edited by)]. **Maladies parasitaires** [Galliard, H. (Edited by)]. Paris VI^{e}: Éditions Techniques S.A., 18, rue Séguier.

The 32nd *cahier* of this publication [see also this *Bulletin*, 1955, v. 52, 1029] contains sections on infection (Professor V. de Lavergne), acute articular rheumatism (Dr. P. Grenet and Dr. M. Caramanian), primary encephalitides of viral origin (Professor P. Castaigne and Dr. J. Cambier), and on the filariases (Professor H. Galliard). These are described and discussed in a clear and orderly manner, and the text is embellished by photographs and diagrams. A valuable feature of the series is the list of references attached to each section. *Charles Wilcocks*

Horsfall, William R. **Mosquitoes. Their Bionomics and Relation to Disease.** pp. viii + 723. 1955. London: Constable & Co. Ltd., 10, Orange Street, W.C.2. [£5.5.0.]

The American edition of this book was reviewed in this *Bulletin*, 1955, v. 52, 497. As will be seen from the title quoted above, an English edition is now available.

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INDEX OF AUTHORS OR SOURCES

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Page numbers within brackets indicate papers not summarized.)

Am.	signifies	Amoebiasis and Intestinal Protozoal Infections.
Bart.	,,	Bartonellosis.
Bl.	,,	Blackwater Fever.
B.R.	,,	Book Review.
Chl.	,,	Cholera.
Def. Dis.	,,	Deficiency Diseases.
Den.	,,	Dengue and Allied Fevers.
Der.	,,	Dermatology and Fungus Diseases.
Ent.	,,	General Entomology and Insecticides: General Zoology.
Ep. Dropsy	,,	Epidemic Dropsy.
Haem.	,,	Haematology.
Heat Str.	,,	Heat Stroke and Allied Conditions.
Hel.	,,	Helminthiasis.
Lab.	,,	Laboratory Procedures.
Leish.	,,	Leishmaniasis.
Lep.	signifies	Leprosy.
Mal.	,,	Malaria.
Misc. Dis.	,,	Miscellaneous Diseases.
Misc. Pap.	,,	Miscellaneous Papers.
Oph.	,,	Tropical Ophthalmology.
Parasit.	,,	Parasitology: General
Pl.	,,	Plague
Rab.	,,	Rabies.
R.F.	,,	Relapsing Fever and other Spirochaetoses.
Reports, etc.		Reports and Surveys.
Sp.	,,	Sprue.
Tox.	,,	Toxoplasmosis.
Tryp.	,,	Trypanosomiasis.
Typh.	,,	Fevers of the Typhus Group.
Ulc.	,,	Tropical Ulcer.
Vms.	,,	Venoms and Antivenenes.
Y.F.	,,	Yellow Fever.
Ys.	,,	Yaws.

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INDEX OF SUBJECTS

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For most diseases, the arrangement is as follows:—(i) general material, (ii) distinct forms of the diseases, (iii) the parasite or parasites.

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